ODESSA AIRPORT SCHLEMEYER FIELD

Airport Layout Plan and Narrative

Phase One

DRAFT

Draft
ALP UPDATE AND NARRATIVE REPORT
Phase 1

Odessa Airport – Schlemeyer Field

Ector County, Texas

Prepared for:
Ector County

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Airport Consultants

June 2022

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INTRODUCTION

This Airport Layout Plan (ALP) Update and Narrative for Odessa Airport-Schlemeyer Field (ODO) serves as an update to the Master Plan that was previously completed in 1997 and the ALP drawing set that was more recently updated in 2012. The primary focus of this study is to provide the airport sponsor (Ector County), the Texas Department of Transportation (TxDOT) – Aviation Division, and the Federal Aviation Administration (FAA) with a strategic plan and vision for short-term and long-term operations, as well as any necessary improvements that may be needed over the next 20 years. The report will include an updated ALP set, which serves as a blueprint of the current and future conditions at the airport. The updates to the ALP will focus on the development direction and facility changes that have taken place since the completion and approval of the previous planning study. The development of a Height Hazard Zoning Map for the sponsor's implementation will also be completed with this study.

This study was designed to guide future development and provide updated justification for projects for which the airport may receive funding participation through federal and state airport improvement programs. Coffman Associates, an airport consulting firm specializing in master planning and environmental studies, is preparing this plan.

The ALP Update and Narrative is being prepared in accordance with FAA requirements, including Advisory Circular (AC) 150/5300-13B, *Airport Design*; AC 150/5070-6B, *Airport Master Plans*; and FAA ARP Standard Operating Procedure (SOP) 2.00 and 3.00 – Appendix A – ALP Review Checklist. The following goals and objectives have been determined for the ALP Update and Narrative.

- Analyze the current situation at ODO by conducting an inventory of existing conditions and operational data
- Identify aviation demand forecasts for airport operations and based aircraft for 5, 10, and 20 years into the future
- Determine facility requirements necessary to meet forecasted demand
- Draft alternatives for airport development and operation, in line with facility requirements
- Select a preferred development concept, which will be reflected on the ALP
- Develop a 20-year demand-based Capital Improvement Plan (CIP), including a recommended phasing plan
- Prepare an updated ALP drawing set of existing and proposed facilities
- Develop a Height Hazard Zoning map

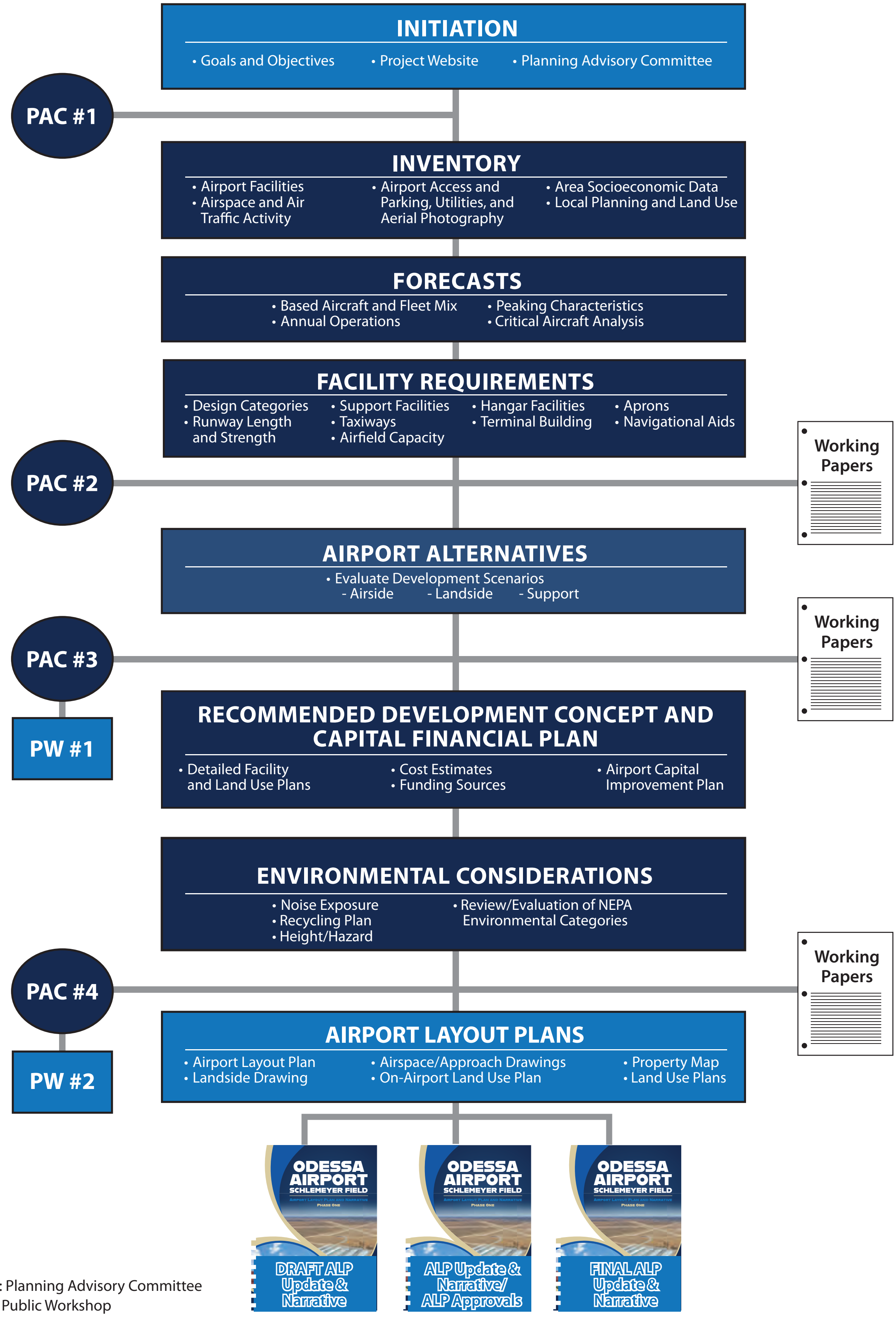
STUDY PARTICIPATION

The ALP Update and Narrative is of interest to many within the local community and region, including local citizens and businesses, community organizations, Ector County officials, airport users and tenants, and aviation organizations. To assist in the development of the study, the county has identified a group of stakeholders to act in an advisory role as the plan progresses. The Planning Advisory Committee (PAC) is comprised of individuals and organizations with a vested interest in the future development of ODO. Members of the PAC will meet at designated points during the planning process to review draft study materials and provide comments to help ensure a realistic and viable plan is developed. A community outreach program will also be established to allow members of the public to review and comment on the study as it develops.

PROCESS

The ALP Update and Narrative is prepared in a systematic fashion pursuant to the scope of services that was coordinated with Ector County and TxDOT Aviation. The study includes several elements which are described below and depicted on **Exhibit 1**:

- **Study Initiation** – Development of the scope of services, budget, and schedule.
- **Inventory** – Inventory of facility and operational data and wind data. This step establishes existing airfield facility conditions and capacities and identifies existing environmental conditions at the airport.



PAC: Planning Advisory Committee
PW: Public Workshop

Exhibit 1
PROJECT WORKFLOW

- **Forecasts** – Aviation demand levels at the airport (based aircraft and operations) are forecasted to establish the existing and ultimate critical aircraft per FAA AC 150/5000-17. The forecasting approach utilizes the FAA's *Terminal Area Forecast* (TAF), as well as regional and local socioeconomic and aviation trends. The forecasts will ultimately be submitted to TxDOT/FAA for review and approval.
- **Facility Requirements** – Determinations will be made for the airport's facility requirements for existing, short-term, intermediate-term, and long-term timeframes based upon both the critical aircraft and updated forecasts.
- **Alternatives** – Evaluation of various development alternatives to accommodate current and forecasted facility needs for airside and landside facilities.
- **Airport Plans and Land Use Compatibility** – Coordination with airport staff and the PAC will result in the selection of a recommended development concept. Airport layout plans will be developed to depict the recommended development concept. The drawings will meet the requirements of FAA's Standard Operating Procedure (SOP), *Standard Procedure for FAA Review and Approval of Airport Layout Plans (ALPs)*, effective date October 1, 2013. The updated ALP set will be included as an appendix to this study. The airport's noise exposure and land use compatibility will also be evaluated. An environmental overview will identify any potential environmental concerns that must be addressed prior to the implementation of the recommended development program.
- **Airport Development Schedules and Cost Estimates** – Development schedules will be prepared for the recommended concept, and potential federal and state aid for specific projects will be identified. A five-year CIP will be prepared to identify capital funds required by the County to accomplish each proposed stage of improvements for the airport.
- **Final Drawings and Reports** – Final report documentation will include a technical report (printed and digital formats) and full-size/full-color copies of report exhibits, and drawings produced for the study.

SWOT ANALYSIS

A SWOT analysis is a strategic business planning technique used to identify **S**trengths, **W**eaknesses, **O**pportunities, and **T**hreats associated with an action or plan. This exercise involves identifying an action, objective, or element, and then identifying the internal and external forces that are positively and negatively impacting it. The internal forces include attributes of the airport and market area that may be considered strengths or weaknesses, while the external forces are those outside the airport's control, such as the aviation industry as a whole or the economy. These manifest as opportunities or threats.

A SWOT analysis was conducted with the PAC in March 2022. A summary of this exercise and discussion is included on the next page. It is important to note that some attributes may fall into more than one category. For example, ODO has a significant amount of property, much of which is undeveloped. This was noted as a strength during the exercise, but it also serves as an opportunity.

S STRENGTHS	• Three runway system • Runway lengths available 6,200 feet (Runway 11-29), 5,703 feet (Runway 2-20), and 5,003 feet (Runway 16-34) can accommodate a wide array of business jets • Nice terminal building with many amenities • Instrument approach capability	• Significant amount of undeveloped property • Airport is not a major tax burden • Hangar space available • Fire station is nearby for emergencies and can access airfield via a knockdown gate • Location – close proximity to highway
W WEAKNESSES	• Significant amount of pavement in need of rehabilitation • Pavement strength is too low to support some aircraft or deters other operators from using ODO • Wildlife on field has led to loss of customers	• Surrounding incompatible land uses including residential and a school located within the Runway 20 approach • Other hard constraints including public roads limit expansion potential
O OPPORTUNITIES	• Increased pilot training is combatting ongoing pilot shortage • New through-the-fence (TTF) operator • Federal funding opportunities due to recent legislation (i.e., Bipartisan Infrastructure Law)	• Economic development in area (i.e., Nacero) • Development potential in the form of commercial activities including non-aeronautical uses
T THREATS	• Competition with other airports for federal/state funds • Residential and educational land uses adjacent to airport	• A pavement strength analysis could determine strengths that are less than what is reported, exacerbating an existing weakness

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AIRPORT BACKGROUND

Odessa Airport-Schlemeyer Field (ODO) is situated approximately five miles north-northeast of the City of Odessa, in Ector County, Texas. Odessa, with a population of 122,630[1], is the primary city within the Odessa metropolitan statistical area (MSA), which is part of the larger Midland-Odessa combined statistical area. The area is one of the fastest growing in the United States, due in large part to its role in the energy sector. The Permian Basin, encompassing more than 86,000 square miles in west Texas and southeastern New Mexico, is the largest oil and natural gas producer in the country. Since oil was first discovered in Odessa in 1927, the city's economy has been characterized by a boom/bust cycle that can be directly linked to the energy market. In addition to oil, Odessa is recognized nationally for its sports culture, with high school football serving as an economic driver in the community.

ODO's history dates back to 1945, when the airport was constructed to serve U.S. military efforts during World War II. Like many airports across the country, the airport was deeded to the local municipality after the war ended, with Ector County assuming ownership and responsibility of the field. Over the years, the airport has been the recipient of both federal and state grants which have funded construction and improvement projects to both the airfield and associated landside buildings. Today, ODO encompasses approximately 790 acres at an elevation of 3,004 feet above mean sea level. The airport serves a wide range of general aviation activities on its three runways and continues to attract users from all over Texas and beyond.

Exhibit 2 depicts the airport in its regional setting.

Airport Terminal Building

CLIMATE

Climate plays an important role in airport planning and preparing for weather conditions enhances the use of an airport. For example, high temperatures and humidity increase runway length requirements, while cloud cover percentages and frequency of inclement weather determine the need for navigational aids and lighting. Knowledge of these weather conditions during the planning process allows the airport to prepare for any improvements that may be needed on the airfield.

[1] U.S. Census Bureau, 2020 American Community Survey

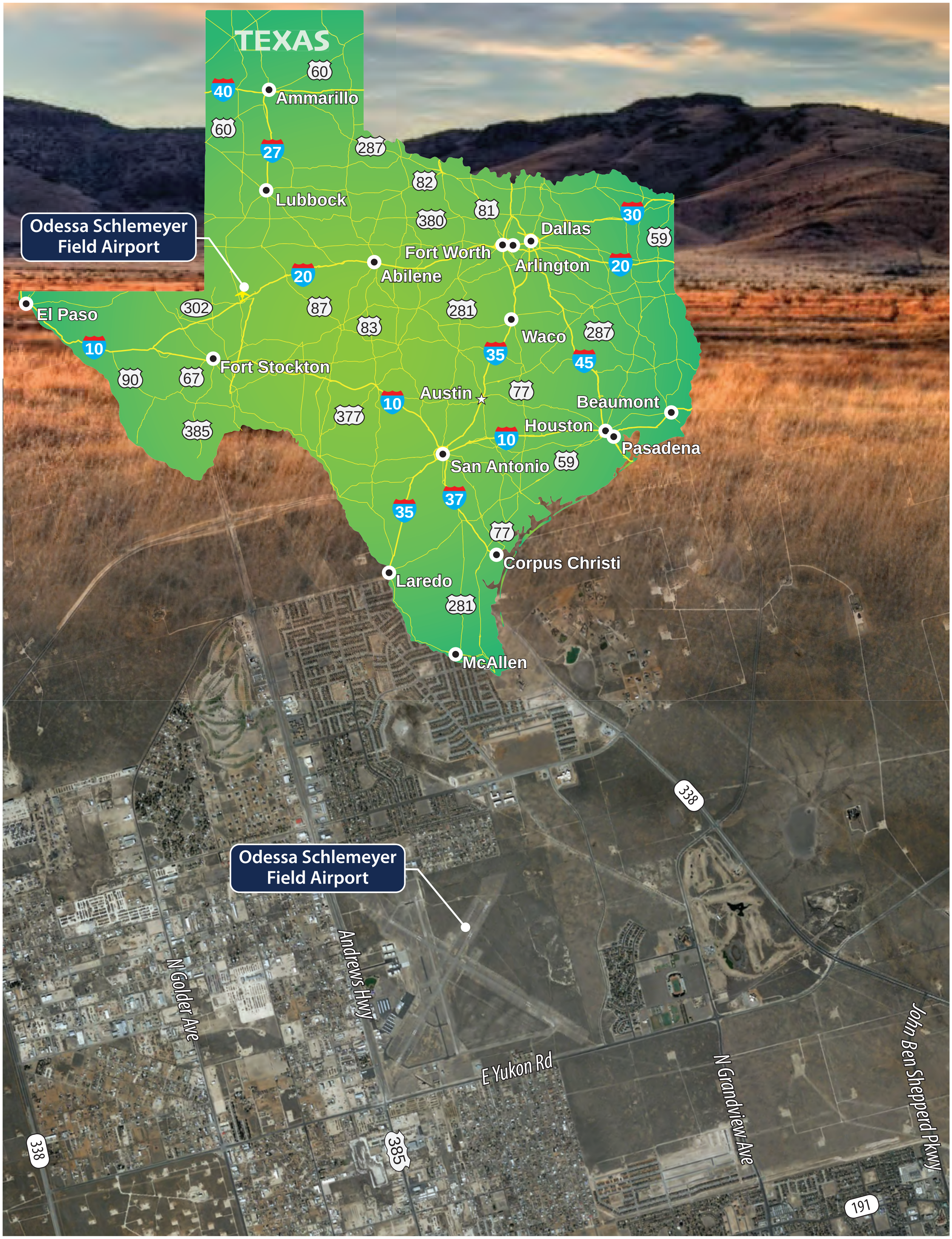

TEXAS
Ammarillo
Lubbock
Odessa Schlemeyer Field Airport
El Paso
Fort Stockton
Abilene
Fort Worth
Dallas
Arlington
Waco
Austin
Houston
Beaumont
Pasadena
San Antonio
Corpus Christi
Laredo
McAllen
Odessa Schlemeyer Field Airport
Andrews Hwy
N Golder Ave
E Yukon Rd
N Grandview Ave
John Ben Shepperd Pkwy
338
385
191

Exhibit 3 summarizes temperature data sourced from the airport's Automated Surface Observation System (ASOS). The data shown represents total weather observations between 1991 and 2020. The hottest month is July, with a maximum high temperature of 95.3 degrees Fahrenheit (F), and January is the coldest month with minimum temperature of 31.7 degrees. Most precipitation occurs during the month of September, which records an average of 1.94 inches of rain.

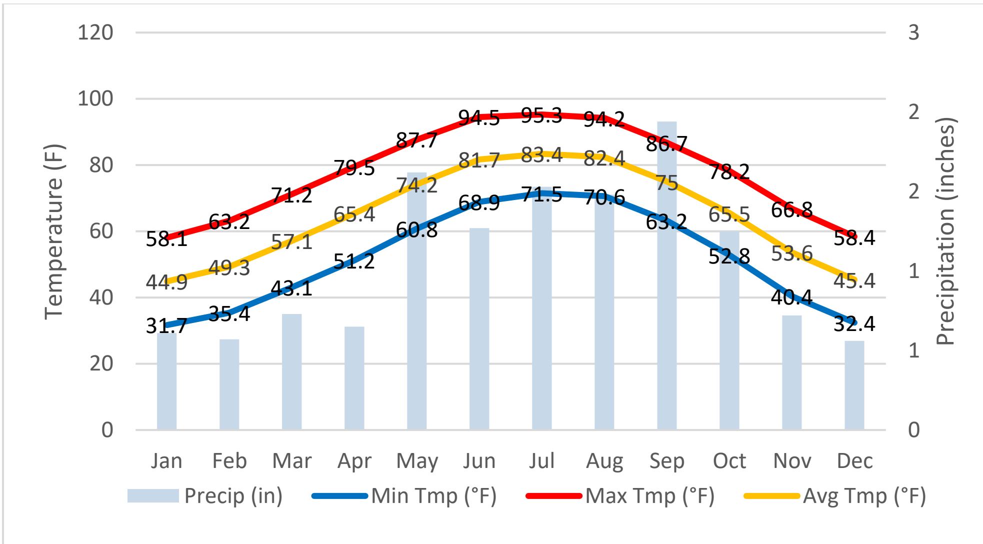


Exhibit 3 – Climate Data

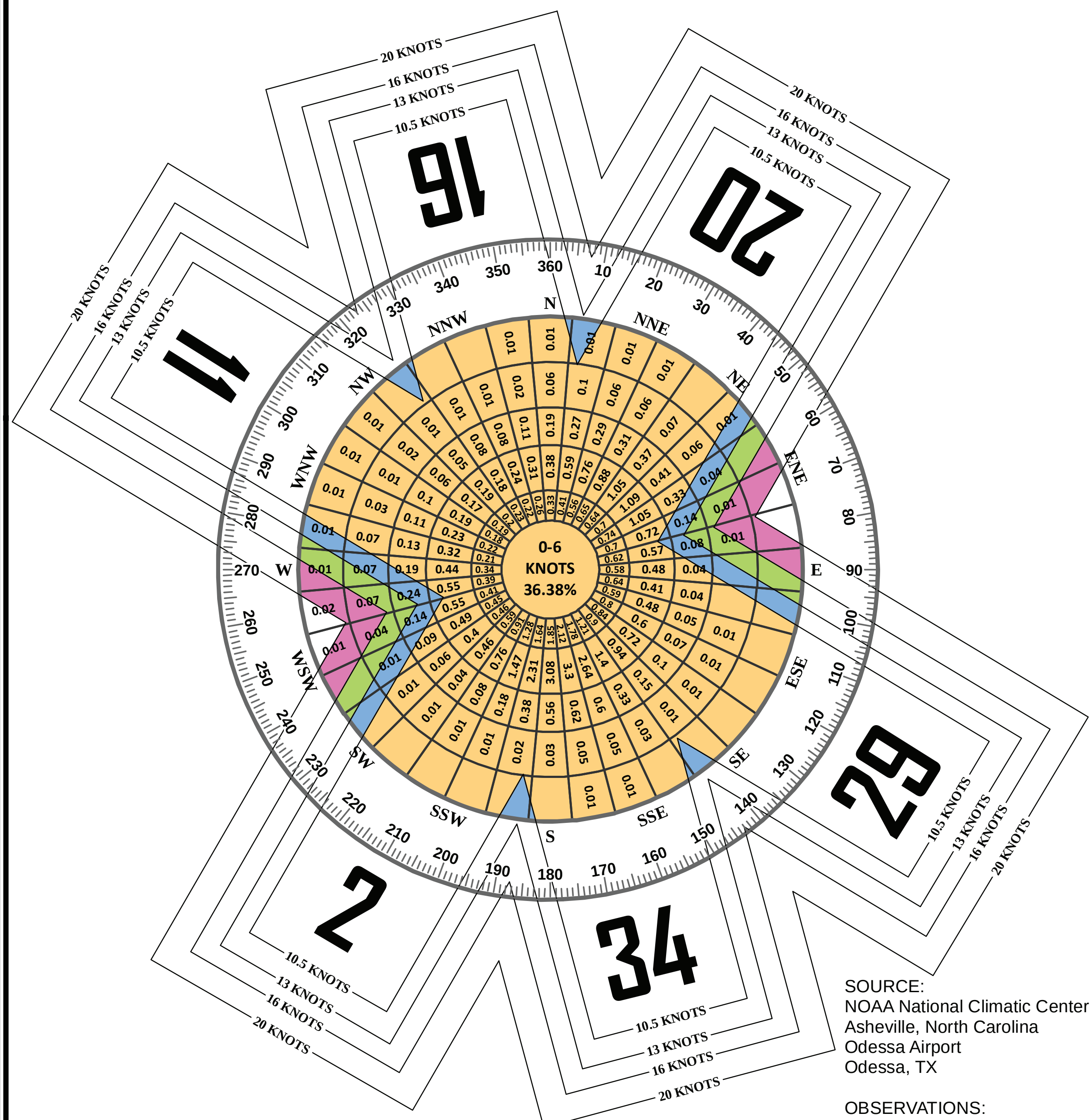
Wind data has also been collected from the airport's ASOS, including wind speeds, direction, and gusts. A total of 96,003 observations of wind direction and other data points were made over a 10-year period beginning January 1, 2011, and ending December 31, 2020, which is the most recent data available for this airport. For the operational safety and efficiency of an airport, it is desirable for the runway to be oriented as close as possible to the direction of the prevailing wind. This reduces the impact of wind components perpendicular to the direction of travel of an aircraft that is landing or taking off.

Exhibit 4 presents the associated wind coverage for the runway system at ODO. Combined, the three runways provide 98.68 percent coverage at 10.5 knots and greater than 99 percent coverage at 13 through 20 knot conditions in all weather conditions. The FAA standard for crosswind coverage is that if the primary runway provides for less than 95 percent coverage, a crosswind runway is justified. Individually, no single runway provides 95 percent or greater wind coverage until the 16-knot component. The eligibility for each runway will be discussed in greater detail in the Forecasts and Facility Requirements sections.

ECONOMIC IMPACT

In 2018, TxDOT Aviation undertook an Economic Impact Study to determine the impact and relationship of airports in Texas within the state's economy. According to the study, ODO is home to several on-airport businesses and is used by visitors from all over the state attending local high school and college football games. Additionally, operations related to the energy sector (oil, gas, wind, and solar) occur frequently.

ALL WEATHER WIND COVERAGE				
Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 11-29	77.51%	87.44%	95.67%	98.94%
Runway 2-20	87.00%	93.43%	97.86%	99.44%
Runway 16-34	86.87%	92.30%	97.06%	99.13%
All Runways	98.68%	99.58%	99.90%	99.99%

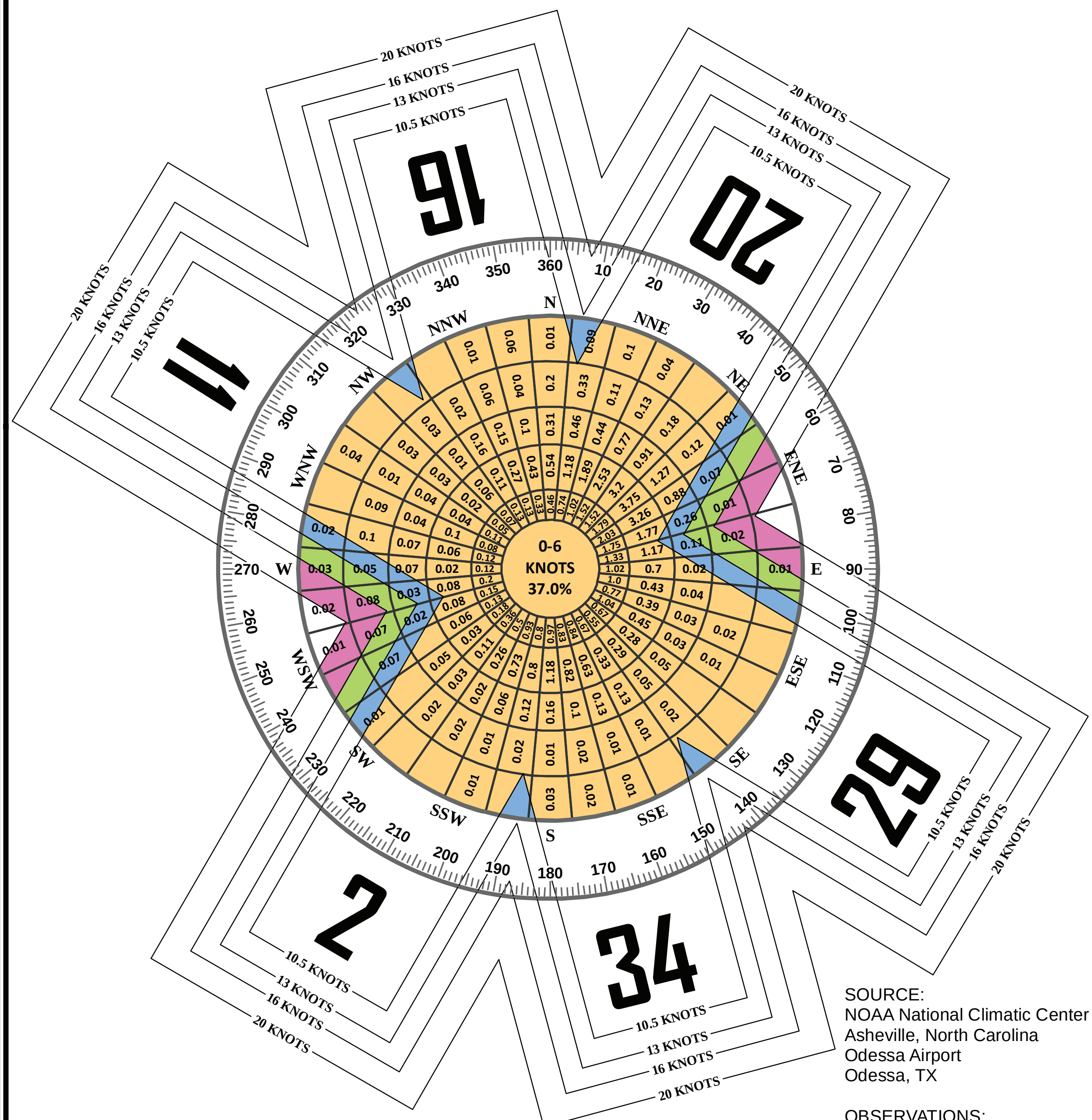


SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Odessa Airport
Odessa, TX

OBSERVATIONS:
96,003 All Weather Observations
Jan. 1, 2011 - Dec, 31 2020

IFR WIND COVERAGE

Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 11-29	71.61%	81.90%	92.39%	97.43%
Runway 2-20	92.18%	95.87%	98.22%	99.24%
Runway 16-34	78.84%	87.43%	95.26%	98.63%
All Runways	98.44%	99.48%	99.82%	99.97%



SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Odessa Airport
Odessa, TX

OBSERVATIONS:
9.714 IFR Weather Observations
Jan. 1, 2011 - Dec, 31 2020

As summarized in **Table 1** and **Exhibit 5**, when combined with the multiplier impact, aviation activity at the airport generated $15.1 million in total economic impact output, created 202 jobs, and paid out $4.7 million in payroll.

TABLE 1 | Aviation Economic Impact

	ODO	All Texas System Airports
Total Economic Activity	$15.1 million	$94.3 billion
Total Payroll	$4.7 million	$30.1 billion
Total Employment	202 jobs	778,955 jobs

Source: Economic Impacts, Odessa Airport-Schlemeyer Field, Odessa (2018), TxDOT

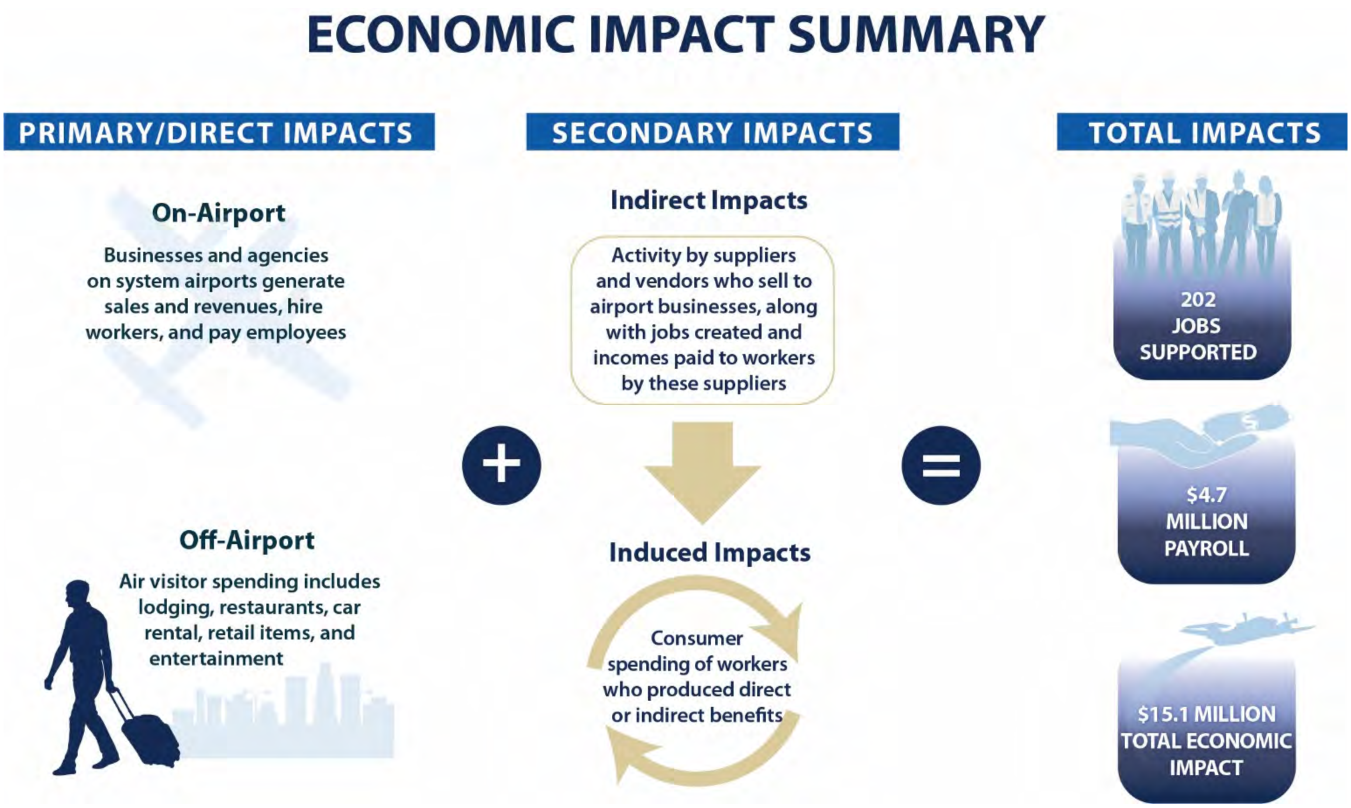


Exhibit 5 – ODO Economic Impact Summary

AIRPORT ROLE

An airport's role, both nationally and regionally, also plays a critical role in facility planning. At the national level, the FAA's *National Plan of Integrated Airport Systems* (NPIAS) categorizes airports based on their importance to national air transportation. Airports included within the NPIAS are qualified for federal funding through the Airport Improvement Program (AIP).

ODO is classified as a general aviation (GA) airport in the NPIAS. GA airports are further classified into one of four categories: National, Regional, Local, and Basic. The airport falls into the National GA category. National airports are located in metropolitan areas and offer pilots an alternative to busy primary airports. These airports typically have high levels of activity and average 203 based aircraft, including 39 jets.

At a more local level, the airport is also included in the 2010 *Texas Airport System Plan* (TASP). The TASP classifies ODO as a Business/Corporate (BC) facility, which is an airport that provides community access by business jets. According to the TASP, "Business/Corporate airports provide access to turboprop and turbojet business aircraft and are located where there is sufficient population or economic activity to support a moderate to high level of business jet activity and/or to provide capacity in metropolitan areas." These airports are generally located more than 30 minutes from commercial service or reliever airports and serve areas with concentrated population, purchasing power, or mineral production. The TASP further classifies ODO into a "regional" functional category, which includes airports that support higher performance aircraft than the surrounding smaller general aviation facilities. These airports may have periodic commuter or charter operations and should be able to provide the best technology available for weather, approach minimums, and approach aids.

AIRPORT ADMINISTRATION

The airport is owned by Ector County and overseen by a seven-person board. Appointments are made by the Ector County Commissioner's Court (four appointments), the County Judge (one appointment), and the other Airport Advisory Board members (one appointment). The seventh member is a representative of the Ector County Airport Association. The Airport Advisory Board oversees the facility and provides guidance on the operation, expansion, planning, and management of the airport. Daily operations are managed jointly by an Airport Manager and Texas Aero, the airport's fixed base operator (FBO).

GRANT HISTORY

To assist in ongoing capital improvements, the FAA and the Texas Department of Transportation – Aviation Division (TxDOT) provide funding to ODO through the Airport Improvement Program (AIP). Texas is a member of the FAA's Block Grant Program, giving TxDOT the responsibility, among other things, for administering AIP grants to reliever and general aviation airports, which includes ODO. The State of Texas also offers funding opportunities that ODO is eligible for, which are listed below.

- *Routine Airport Maintenance Program (RAMP)* – TxDOT matches local program grants up to $50,000 for basic improvements such as parking lots, fencing, and other airside or landside needs.
- *Federal Aviation Grants* – Provides federal and state grant funding for maintenance and improvement projects to airports included in the NPIAS.

Table 2 summarizes airport capital improvement projects and maintenance undertaken since 2002, with funding coming from federal, state, and local sources. TxDOT has awarded ODO over $11.7 million for airport improvement projects, including major runway and taxiway construction, visual approach aids, apron expansion, and installation of security fencing, among others. It should be noted that maintenance of Runway 2-20 is funded by Ector County.

TABLE 2 | TxDOT and FAA Grant Funded Airport Capital Improvement Project History

Year	Project Description	Local	State	Federal
2002	Acquire land for Runway 11-29 RPZ and relocation of sheriff's posse	$41,957		$377,611
2006	Replace sign panels Runway 2-20; Construct & realign new Runway 11-29 (6200 x 100); Install erosion/sedimentation controls; Mark Runway 11-29 (25,000 sf); Install MIRL Runway 11-29 (6200 lf); Install PAPI-4 Runway 11-29; Install taxiway centerline reflectors (7000 lf); Construct parallel & stub TWs to Runway 11-29 (8200 x 35); Relocate pipeline metering station; Install Runway 11-29 signs; (NPE 2006 2004 2005 and 2007)	$608,758		$5,478,823
2006	RAMP: Runway and taxiway crack repair and seal	$30,000	$30,000	
2006	Update ALP	$2,732		$24,591
2009	Design terminal building	$48,317	$48,317	
2009	Engineering/design to reconstruct north terminal apron (24,530 sy); Install sedimentation controls; Rehabilitate TW G (3250 x 35); Replace signage; Rehabilitate TW E (1380 x 35); Mark Runway 16-34 (25,600 sf); Rehabilitate Taxiway C (675 x 35); Contingency/RPR/Admin. services, etc.; Reconstruct south terminal apron (15,160 sy); Construct terminal building apron (5,120 sy); Rehab Runway 16-34 (5000 x 75); Improve drainage; Rehabilitate hangar access TWs (39,460 sy); Replace VASI w/PAPI-2s Runway 16-34; Rehabilitate & mark Taxiway F (15,400 sy) (SBGP-46-2008 $184,914; SBGP-49-2008 $28,500)	$11,232		$213,414
2010	RAMP: Airport entrance road construction and misc. paving repairs/maintenance	$20,797	$20,797	
2011	Replace signage; Rehabilitate & mark Taxiway F (15,400 sy); Rehabilitate hangar access taxiways (39,460 sy); Reconstruct north terminal apron (24,530 sy); Contingency/RPR/Admin. services, etc.; Replace VASI w/PAPI-2s Runway 16-34; Rehabilitate Taxiway E (1380 x 35); Rehabilitate Taxiway G (3250 x 35); Reconstruct south terminal apron (15,160 sy); Improve drainage; Construct terminal building apron (5,120 sy); Install sedimentation controls; Mark Runway 16-34 (25,600 sf); Rehab Runway 16-34 (5000 x 75); Rehabilitate Taxiway C (675 x 35) (SBGP-46-2008 $2,797,196; SBGP-84-2013 $160,206; SBGP-41-2007 $ 776,786; SBGP-73-2001 $357,682)	$454,652		$4,091,870
2011	Construct auto parking lot (920 sy); Construct new terminal building	$572,962	$551,683	
2012	RAMP: Airport general maintenance	$48,935	$48,935	
2013	RAMP: Airport general maintenance	$3,616	$3,616	
2014	Replace PAPI-4 RW 11-29		$102,202	
2014	RAMP: Airport general maintenance	$50,000	$50,000	
2015	RAMP: Airport general maintenance	$10,545	$10,545	
2016	RAMP: Airport general maintenance	$50,000	$50,000	
2017	Engineering and Design for Installation of ODALS for Runway 11/29; Engineering and Design Terminal Apron Expansion - 2013, 2014, and 2015 NPE; (SBGP-090-2015 $92,957.22; SBGP-097-2016 $19,899.23; SBGP-104-2017 $3,025.76)	$12,876		$115,882
2017	RAMP: Airport general maintenance	$19,950	$19,950	
2018	RAMP: Airport general maintenance	$49,118	$49,118	
2019	RAMP: Airport general maintenance	$50,000	$50,000	
2020	RAMP: Airport general maintenance	$50,000	$50,000	
2021	RAMP: Airport general maintenance	$50,000	$50,000	
2022	ALP Update			$285,969
	Totals	**$2,186,447**	**$1,135,163**	**$10,588,160**

- MIRL – Medium Intensity Runway Lights
- ODALS – Omnidirectional Approach Lights
- PAPI – Precision Approach Path Indicator
- RPZ – Runway Protection Zone

Source: Airport records

AIRPORT FACILITIES

Airport facilities are functionally classified into two broad categories: airside and landside. The airside category includes those facilities directly associated with aircraft operations. The landside category includes those facilities necessary to provide a safe transition from surface-to-air transportation and support aircraft servicing, storage, maintenance, and operational safety.

ODO Airfield

AIRFIELD FACILITIES

Runways

Airfield facilities at ODO, which are depicted on **Exhibit 6**, include the runway, taxiways, lighting, and navigational aids. The airport configuration at ODO consists of three runways. Details about each runway are included below.

Runway 11-29 | Runway 11-29 is oriented northwest/southeast and is reported to be in good condition. The runway is constructed of asphalt and measures 6,200 feet long by 100 feet wide. As reported on FAA Form 5010, *Airport Master Record*, Runway 11-29 has a weight-bearing capacity of 30,000 lbs. single wheel loading (SWL), which refers to the design of certain aircraft landing gear having a single wheel main landing gear strut.

Runway 2-20 | Runway 2-20 measures 5,703 feet long by 75 feet wide and is oriented southwest/northeast. The asphalt runway is reported to be in good condition and has a weight-bearing capacity of 14,000 pounds SWL.

Runway 16-34 | Runway 16-34 is 5,003 feet long by 75 feet wide and is constructed of asphalt, reported to be in excellent condition. The runway is oriented north-northwest/south-southeast and has a weight bearing capacity of 14,000 pounds SWL.

Taxiways

The taxiway system at ODO consists of partial-parallel, access, and connector taxiways that provide access to the runways and landside facilities. Taxiways are constructed of asphalt and equipped with green centerline reflectors. **Exhibit 6** depicts each taxiway in its location, and **Table 3** details pertinent information about each taxiway.

TABLE 3 | ODO Taxiway System

Designation	Function	Width (in feet)
A	Landside access	35-45
C	Connector	50
D	Partial-parallel, exit, runway access	40
E	Landside access, exit	35-50
F	Runway access	35
G	Partial-parallel, runway access	35

Source: Airport records

Pavement Condition

A pavement condition survey was conducted for ODO in 2020 and evaluated the runways, taxiways, and apron. [2] The inspection resulted in a pavement condition index (PCI) rating for each section of pavement. PCI ratings are determined through a visual assessment in accordance with FAA Advisory Circular 150/5380-6 and range from 0 (failed) to 100 (excellent) and are categorized as poor (PCI between 0 and 54), fair (PCI between 55 and 69), and good (PCI between 70 and 100). According to the 2020 pavement inspection, all of the runway pavement at ODO and most of the taxiway and apron pavement falls into the 'good' category. Portions of Taxiways A, E, F, and G are in the 'fair' category. **Exhibit 7** illustrates the pavement condition at ODO.

Pavement Markings

All runways at ODO have non-precision markings that include the runway centerline, designation, threshold markings, and aiming points. Yellow taxiway markings are provided to assist pilots in maintaining proper clearance from pavement edges and objects near the taxiway/taxilane edges. Apron pavement markings also identify aircraft tiedown positions.

Each entrance to the runway is equipped with yellow holding position markings. These markings indicate to pilots their position on the airfield, as well as help prevent inadvertent access to the runway. Hold lines also help to ensure proper separation between aircraft prior to entering the runway. Pilots using non-towered airports must visually confirm no aircraft traffic prior to crossing the hold line. Holding position markings are located at least 250 feet from the Runway 11-29 centerline, 200 feet from the Runway 2-20 centerline, and 200 feet from the Runway 16-34 centerline.

[2] Pavement Condition Report, Texas A&M Transportation Institute, 2020

RUNWAYS	Airfield Data					
Runway Designation	**11**	**29**	**2**	**20**	**16**	**34**
Length	6,200'		5,703'		5,003'	
Width	100'		75'		75'	
End Elevation	2,973.5'	2,979.5'	2,952.4'	3,003.6'	2,986.6'	2,958.2'
Gradient	0.10%		0.90%		0.57%	
Surface Material/Condition	Asphalt/Good		Asphalt/Good		Asphalt/Excellent	
Markings	Non-precision	Non-precision	Non-precision	Non-precision	Non-precision	Non-precision
Lighting	MIRL		MIRL		MIRL	
Load Bearing Strength - SWL	30,000 lbs.		14,000 lbs.		14,000 lbs.	
Load Bearing Strength - DWL	NA		NA		NA	
Visual Approach Aids	PAPI-4	PAPI-4	VASI	VASI	PAPI-2	PAPI-2
Approach Lighting System	MALS	MALS	None	None	None	None
Instrument Approach Procedures	LPV (GPS)	LPV (GPS)	None	LNAV (GPS)	None	None
Traffic Pattern	Left	Left	Left	Left	Left	Left
Taxiways						
Lighting	None; Green Centerline reflectors					
Surface Material	Asphalt					
Width	35' to 50'					

WEATHER AND NAVIGATIONAL AIDS
ASOS
Lighted Wind Cone, Supplemental Windcones
Tetrahedron
Segmented Circle
Rotating Beacon

LEGEND

- Airport Property Line
- A Taxiway Designator

KEY

ASOS: Automated Surface Observing System
GPS: Global Positioning System
LNAV: Lateral Navigation
LPV: Localizer Performance with Vertical Guidance
MALS: Medium Intensity Approach Lighting System
PAPI: Precision Approaching Path Indicator
VASI: Visual Approach Slope Indicator

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Exhibit 7 – Airfield Pavement Condition

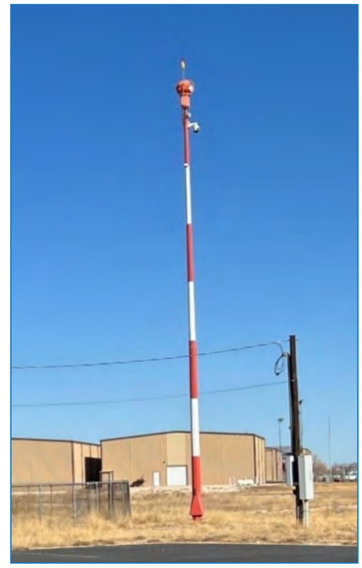
Airfield Signage

Airfield identification signs assist pilots in identifying runways, taxiway routes, holding positions, and critical areas. ODO is equipped with lighted signs located at each taxiway intersection.

Airfield Lighting

Airfield lighting systems extend an airport's usefulness into periods of darkness and/or poor visibility. A variety of lighting systems are installed at an airport for this purpose. These lighting systems, categorized by function, are summarized as follows:

Identification Lighting | The location of the airport is identified by a rotating beacon. A rotating beacon projects two beams of light, one white and one green, 180 degrees apart. The rotating beacon at ODO is located south of the terminal building adjacent to the south apron.


Rotating Beacon

Runway and Taxiway Lighting | Runway lighting utilizes fixtures placed near the pavement edge to define the lateral limits of the runway. Both runway and taxiway lighting are imperative for safe and efficient access to and from aircraft parking areas and the runway, especially after dark and during times of low visibility. All runways at ODO are equipped with a medium intensity runway lighting (MIRL) system. Lights are set atop frangible supports, so if one is struck by an object, such as an aircraft wheel, they can easily break away. There is no taxiway lighting at ODO; however, green taxiway centerline reflectors are present and provide a visual guidance to taxiing aircraft.

Approach Lighting System | An approach lighting system (ALS) is a configuration of lights positioned symmetrically along the extended runway centerline to supplement navigational aids, such as an ILS, to provide lower visibility minimums. Examples include the ALS with Flashing Lights (ALSF), ALS with Sequenced Flashers I & II (ALSF-1/ALSF-2), Medium Intensity ALS with Runway Alignment (MALSR), and the Medium Intensity ALS (MALS). Both ends of Runway 11-29 are equipped with a MALS, which supports the existing published localizer performance with vertical guidance (LPV) GPS approach.

Visual Approach Lighting | Visual approaches at many GA airports are aided by lighting systems, such as a precision approach path indicator (PAPI) or a visual approach slope indicator (VASI), which provides visual approach slope guidance. The more sophisticated PAPI lighting system consists of a configuration of lights located at various distances from the runway threshold and gives pilots an indication of being above, below, or on the correct descent glide path to the runway. Both ends of Runway 11-29 are equipped with a four-light PAPI (PAPI-4) system, with the standard 3.00-degree glide path. Runway 16-34 is equipped with a two-light PAPI (PAPI-2) system at both ends, and Runway 2-20 has a VASI system at each end of the runway.

Runway End Identifier Lights (REILs) | REILs provide a visual identification of the runway end for landing aircraft. The REILs consist of two synchronized flashing lights, located laterally on each side of the runway end, facing the approaching aircraft. These flashing lights can be seen day or night for up to 20 miles depending on visibility conditions. None of the runways are equipped with REILs.

Pilot-Controlled Lighting | With the pilot-controlled lighting (PCL) system, pilots can turn on the MIRL from an aircraft through a series of clicks of their radio transmitter. Pilots using the airport can activate this system via a frequency of 123.0 MHz.

Weather Facilities


Lighted Wind Cone and Segmented Circle

ODO is equipped with a lighted wind cone near the juncture of Runway 11-29 and Taxiway D. Wind cones provide pilots with wind speed and direction information. The lighted wind cone is co-located with a segmented circle, which provides traffic pattern information to pilots. There are also five supplemental wind cones located near the ends of Runways 2, 20, 16, and 34 and on top of a T-hangar on the south apron.

The airport also has a tetrahedron wind indicator located west of Runway 16-34 near the south apron. The tetrahedron functions essentially as a weathervane, swinging freely to point into the wind, and is an alternative to the more commonly used wind cone.


ASOS Equipment

Many airports are equipped with an automated weather observation system (AWOS) or an ASOS, which automatically records weather conditions, such as wind speed, wind gusts, wind direction, temperature, dew point, altimeter setting, and density altitude. This information is then transmitted at regular intervals and is accessible to pilots. The airport is equipped with an ASOS, and weather information can be obtained via radio frequency 119.275 MHz or by calling 432-363-9719.

Navigational Aids

Navigational aids are electronic devices that transmit radio frequencies, which pilots of properly equipped aircraft can translate into point-to-point guidance and position information. The types of electronic navigational aids available for aircraft operating near ODO include the very high frequency omnidirectional range (VOR) facility, a nondirectional beacon (NDB), and the global positioning system (GPS).

A VOR, in general, provides azimuth readings to pilots of properly equipped aircraft transmitting a radio signal at every degree to provide 360 individual navigational courses. Frequently, distance measuring equipment (DME) is combined with a VOR facility (VOR/DME) to provide distance as well as direction information to the pilot. Military tactical air navigation aids (TACANs) and civil VORs are commonly combined to form a VORTAC. The VORTAC provides distance and direction information to both civil and military pilots. The Midland VORTAC is located 11.3 nautical miles (nm) to the east, while the Wink VORTAC and Big Spring VORTAC are located 43.8 nm west and 53.8 nm northeast, respectively.

An NDB is a radio transmitter at a known location, used as an aviation or marine navigational aid. The signal transmitted does not include inherent directional information, in contrast to other navigational aids, such as a VOR. NDB signals follow the curvature of the Earth, so they can be received at much greater distances at lower altitudes, a major advantage over VOR. Pilots at ODO can utilize the Farly NDB located 5.1 nm northeast.

GPS is an additional navigational aid for pilots. GPS was initially developed by the United States Department of Defense for military navigation around the world. GPS differs from VOR in that pilots are not required to navigate using a specific ground-based facility. GPS uses satellites placed in orbit around the Earth that transmit electronic radio signals, which pilots of properly equipped aircraft use to determine altitude, speed, and other navigational information. With GPS, pilots can navigate directly to any airport in the country and are not required to navigate using a ground-based navigational facility.

Instrument Approach Procedures

Instrument approach procedures are a series of predetermined maneuvers established by the FAA using electronic navigational aids that assist pilots in locating and landing at an airport during low visibility and cloud ceiling conditions. Instrument procedures are defined as either precision approach, approach with vertical guidance (APV), or non-precision. Precision instrument approaches provide an exact course alignment and vertical descent path for an aircraft on final approach to a runway with a height above threshold (HATh) lower than 250 feet and visibility lower than ¾-mile. APVs also provide course alignment and vertical descent path guidance but have HATh s of 250 feet or more and visibility minimums of ¾-mile or greater. Non-precision instrument approach aids provide only horizontal guidance.

Instrument approach procedure capabilities are defined by visibility and cloud ceiling minimums. Visibility minimums define the horizontal distance the pilot must be able to see to complete the approach. Cloud ceilings define the lowest level a cloud layer (defined in feet above the ground) can be situated for the pilot to complete the approach. If the observed visibility or cloud ceilings are below the minimums prescribed for the approach, the pilot cannot complete the instrument approach and must commence a missed approach procedure.

ODO is currently equipped with three straight-in approaches and one circling VOR-A approach. Instrument approaches based on GPS have become very common across the country. GPS is an inexpensive option for local airports as it does not require a significant investment in ground-based systems by an airport or FAA. Both ends of Runway 11-29 ends are served by GPS LPV approaches. GPS LPV approaches provide both horizontal and vertical guidance information to pilots but are not considered precision approaches. These approaches provide for the lowest cloud ceiling minimums at 200 feet above ground level (AGL) with visibility minimums down to ¾-mile. Runway 20 is also equipped with a GPS-based approach which provides lateral navigation (LNAV) guidance, with cloud ceiling minimums at 500 feet AGL and visibility minimums down to one mile for aircraft with approach speeds of less than 121 knots. For aircraft with approach speeds of 121 knots or greater, the visibility minimums are increased.

ODO has another published approach that utilizes very high frequency omnidirectional range (VOR) technology and provides circling minimums. Circling minimums allow pilots the flexibility to land on the runway most closely aligned with the prevailing wind at that time. This flexibility generally requires circling approaches to have higher visibility minimums than the straight-in approaches. This is done to provide pilots with sufficient visibility and ground clearance to navigate visually from the approach to the desired runway end for landing. This circling instrument approach procedure is non-precision in nature.

LANDSIDE FACILITIES

Landside facilities are the ground-based facilities that support the aircraft and pilot/passenger handling functions. These facilities typically include the airport terminal building, aircraft storage hangars, aircraft parking aprons, and support facilities, such as fuel storage and roadway access. Landside facilities are identified on **Exhibit 8**.

Airport Terminal and On-Airport Businesses

The airport terminal building is located on the west side of the airfield and can be accessed via Andrews Highway. The building was constructed in 2010 and encompasses approximately 4,100 square feet. The terminal offers a large, well-appointed lobby, conference room, flight planning room, offices, pilots' lounge and snooze room, kitchen/vending, and restrooms.

Terminal Building

Fixed Base Operator | The terminal also houses the airport's sole FBO, Texas Aero. The full-service FBO operates Monday through Friday from 6:00 a.m. to 8:00 p.m., Saturday from 8:00 a.m. to 5:00 pm, and Sunday 8:00 a.m. to 8:00 p.m., with after-hours services available upon request. Services include Jet A and 100LL fuel, hangar storage, aircraft services, aircraft tiedowns, and courtesy and rental vehicles.

Specialized Aviation Service Operator | Epic Aero is a specialized aviation service operator (SASO) that operates out of a 17,200 square foot hangar located on the southwest side of the airfield. Epic Aero offers aircraft maintenance, aircraft sales, and aircraft cleaning services.

Flight Training | Aerotex Aviation offers flight training at the airport. Aerotex is located on the southwest side of the airfield and operates out of a 17,000 sf conventional hangar. They offer different pilot training programs as well as a flying club that provides aircraft rental to members.

Non-Aeronautical Uses | Approximately 12 acres of land on the west side of airport property is used by Odessa College. The site is home to Wrangler Field, which opened in 2019 after the American Legion Ballpark closed and the facility was renovated.

Through-the-Fence Operators | "Through-the-fence" activities are those that are permitted by the airport sponsor through an agreement that provides access to the airside infrastructure to independent entities that have property adjacent to airport property. At ODO, there are through-the-fence operators on the southwest side of airport property, with access to the airfield via the south ramp T-hangar complex.

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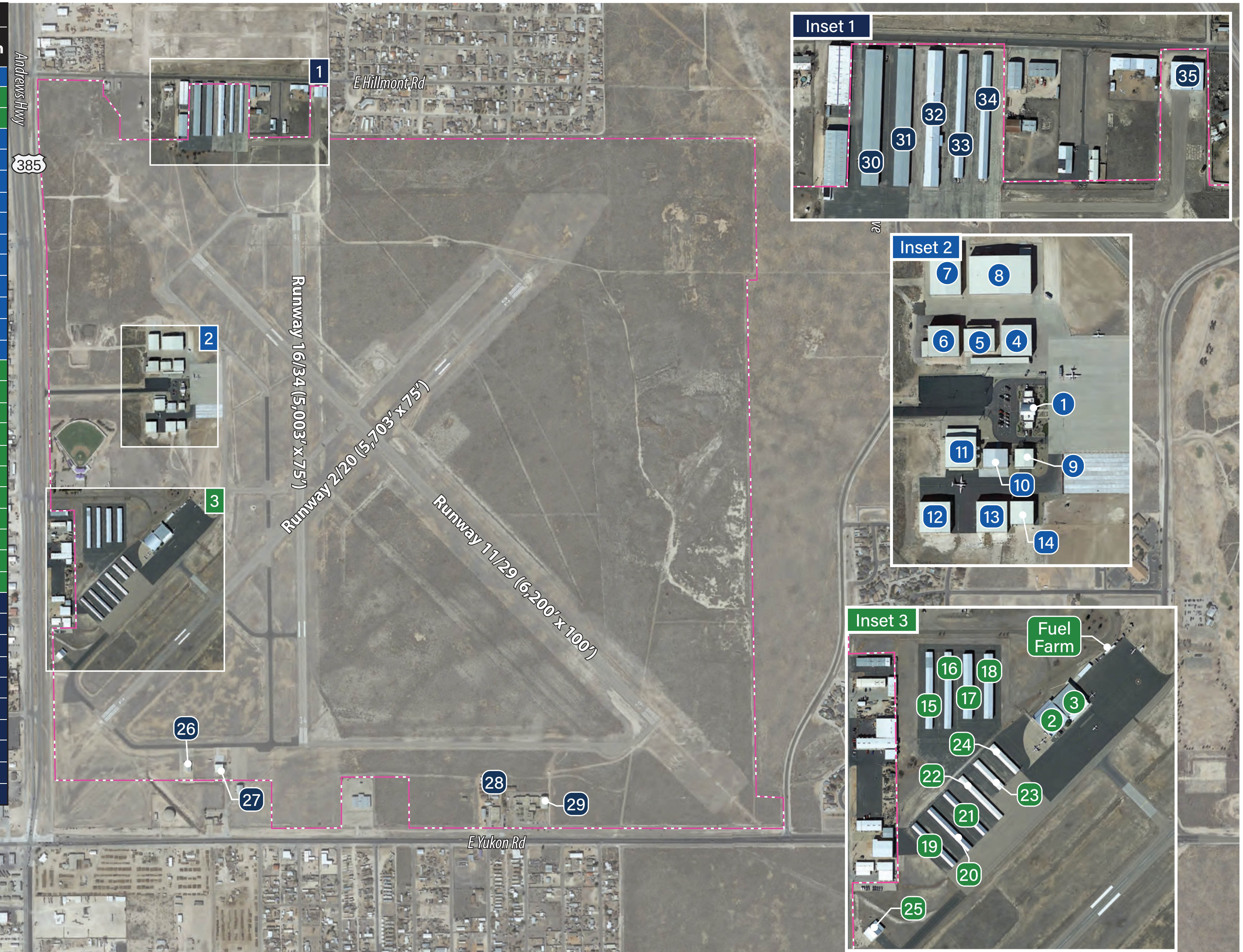
Existing Landside Facilities

Building Number	Description	Size	Condition
1	Terminal/FBO	4,100	Excellent
2	Conventional Hangar (Epic Aero)	17,200	Unknown
3	Conventional Hangar	17,000	Unknown
4	Conventional Hangar	10,000	Excellent
5	Executive Hangar	7,300	Excellent
6	Conventional Hangar	10,000	Excellent
7	Conventional Hangar	15,000	Excellent
8	Conventional Hangar	25,000	Excellent
9	Executive Hangar	3,500	Excellent
10	Executive Hangar	4,700	Excellent
11	Conventional Hangar	10,100	Excellent
12	Conventional Hangar	10,000	Excellent
13	Conventional Hangar	10,000	Excellent
14	Executive Hangar	5,500	Excellent
15	12-Unit T-Hangar	13,700	Good
16	12-Unit T-Hangar	13,700	Good
17	8-Unit T-Hangar	14,500	Good
18	8-Unit T-Hangar	14,500	Good
19	6-Unit T-Hangar	6,200	Poor
20	6-Unit T-Hangar	6,200	Poor
21	10-Unit T-Hangar	8,600	Poor
22	10-Unit T-Hangar	8,600	Poor
23	10-Unit T-Hangar	8,600	Poor
24	10-Unit T-Hangar	8,600	Poor
25	Executive Hangar	5,300	Unknown
26	Executive Hangar	5,500	Unknown
27	Executive Hangar	5,900	Unknown
28	Alternative Education Center	NA	NA
29	Ector County Youth Center	NA	NA
30	21-Unit T-Hangar	30,900	Good
31	21-Unit T-Hangar	30,900	Good
32	21-Unit T-Hangar	27,700	Fair
33	16-Unit T-Hangar	14,700	Fair
34	16-Unit T-Hangar	14,700	Fair
35	Conventional Hangar	12,300	Unknown

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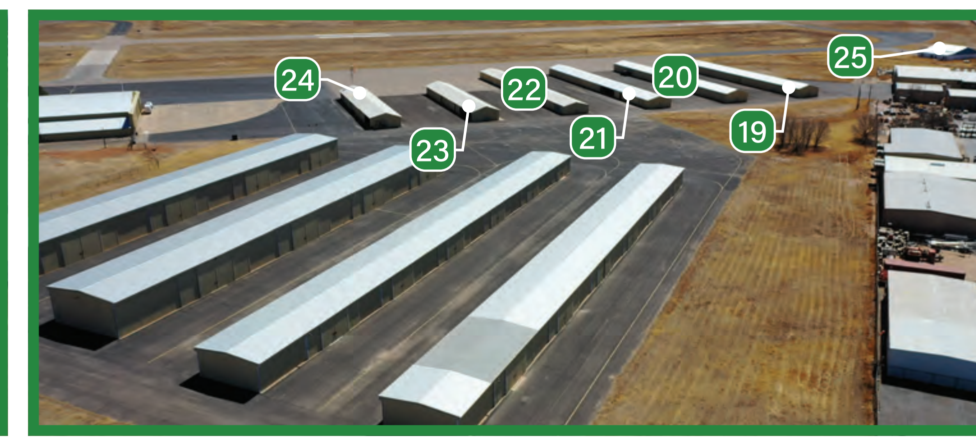
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Aircraft Parking Aprons

The airport is served by four aircraft parking aprons, as depicted on **Exhibit 9**. The north apron fronts the T-hangars located along Hillmont Road and is approximately 6,500 square-yards (sy) in size with 10 marked aircraft parking positions that remain visible on the apron. This apron can be accessed via Taxiway G. The FBO/terminal apron can be accessed from Taxiway A and is approximately 16,600 sy. This apron is frequently used to park aircraft, though there are no marked parking positions. The south apron is the largest at approximately 28,800 sy, with 28 marked parking positions and can be accessed via Taxiway. The south T-hangar apron is situated between the two T-hangar complexes on the south side of the airfield. This area encompasses approximately 5,700 sy and includes 15 marked parking positions.

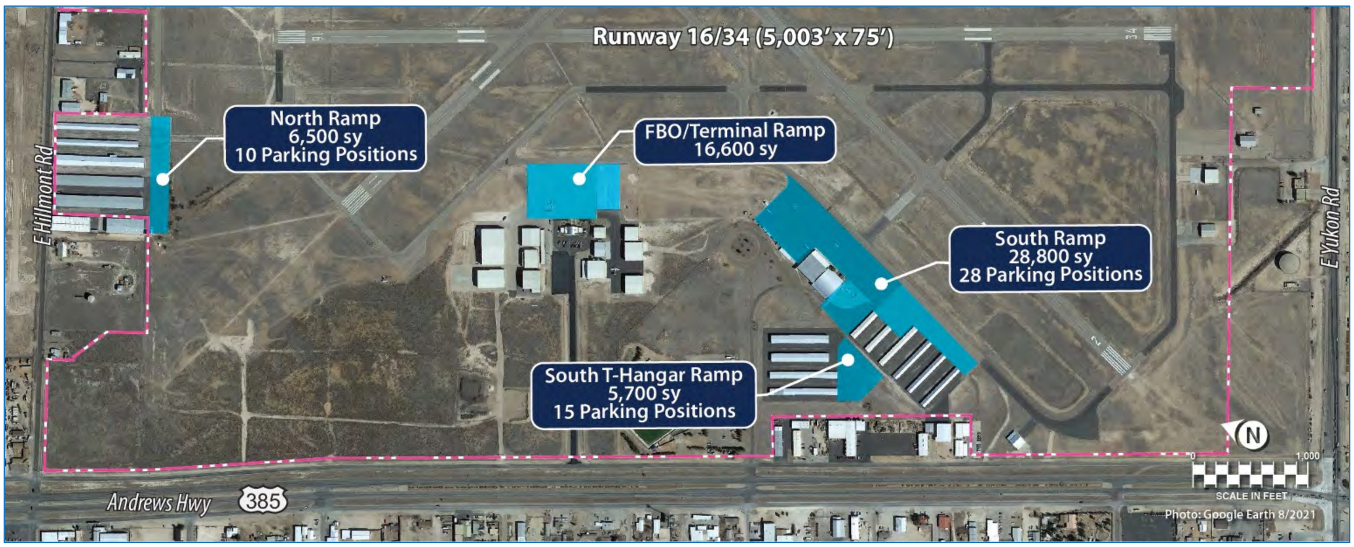

Exhibit 9 – Aircraft Parking Aprons

Aircraft Storage

A variety of aircraft storage hangars are available at ODO, all located on the north and west side sides of the airfield. In total, there are 15 T-hangars providing 187 individual units and approximately 222,100 sf of aircraft storage face. T-hangars are located on the north side of the field along Hillmont Road and on the southwest side along Andrews Highway. Executive hangars, which typically have a footprint between 2,500 and 10,000 sf, comprise approximately 37,700 sf of space among seven units. Conventional hangars are 10,000 sf or more in size. There are 10 conventional hangars at ODO, offering approximately 136,600 of space. In all, the airport provides nearly 400,000 sf of hangar space for aircraft storage. Additional information about hangars is included on **Exhibit 8**.

Fuel Storage Facilities

Fuel storage facilities at ODO are located on the south apron, as shown on **Exhibit 8**. There are three aboveground tanks, one for 100LL fuel and two for Jet A. The 100LL tank has a capacity of 10,000 gallons, and the Jet A tanks have a 12,000-gallon capacity each. 100LL is dispensed via a self-service pump equipped with a credit card reader, while Jet A fuel is distributed by FBO staff. There are also five fuel trucks, two for 100LL and three containing Jet A fuel. These trucks have combined capacities of 1,950 gallons for 100LL and 10,200 gallons for Jet A.

Historic fuel flowage data is summarized in **Table 4**. In fiscal year (FY) 2021, the airport dispensed 115,204 gallons of 100LL fuel and 410,126 gallons of Jet A. Fuel flowage over the last three years has averaged 122,342 gallons of 100LL and 450,711 gallons of Jet A.

TABLE 4 | Fuel Flowage

Fiscal Year	100LL	Jet A	Total Fuel Sold
FY2019	147,950	570,759	718,709
FY2020	103,873	371,247	475,120
FY2021	115,204	410,126	525,330

Source: FBO records

Aircraft Rescue and Firefighting Facilities (ARFF)

As a general aviation airport, ODO is not required to have on-site ARFF equipment or facilities. The airport is served by the City of Odessa Fire Department. Station #8 is located on Yukon Road, immediately south of airport property.

Perimeter Fencing

The perimeter of the airfield is fully enclosed by fencing. This consists primarily of eight-foot wildlife resistant fencing with three-strand barbed wire. Automatic gates at various locations provides secure access to the airfield, with a code required to enter.

Automobile Access and Parking

The terminal building and hangars in this area can be accessed via East Terminal Drive, which extends from Andrews Highway. Hangars on the south side of the field can also be accessed from Andrews Highway, via East Centergate Street. North side hangars can be accessed from East Hillmont Road.

A paved vehicle parking area is located in front of the terminal and provides 22 parking spaces, including two handicapped spaces. An additional lot immediately to the west provides 31 spaces for tenants as well as overflow parking for the terminal. T-hangar tenants typically park outside of their hangar.

AVIATION ACTIVITY

AIRCRAFT OPERATIONS

Aircraft operations (takeoffs and landings) are a primary indicator of aeronautical activity at ODO. Aircraft operations are classified as local or itinerant. Local operations often consist of touch-and-go or pilot training activity. Itinerant operations consist of aircraft that arrive from or depart to destination airports outside the local operating area.

Aircraft operations can be separated into four general categories: air carrier, air taxi, general aviation, and military. The following provides a description of these categories of aircraft operations:

- **Air Carrier** – operations defined as those conducted commercially by aircraft having a seating capacity of 60 or more seats and a cargo payload capacity of more than 18,000 pounds. There are currently no air carriers operating at the airport by definition of an air carrier operation.
- **Air Taxi** – operations associated with aircraft originally designed to have less than 60 passenger seats or a cargo payload of less than 18,000 pounds and carries cargo or mail on either a scheduled or charter basis, and/or carries passengers on an on-demand basis or limited scheduled basis.
- **General Aviation (GA)** – civil aviation operations other than scheduled air services and nonscheduled air transport operations for hire. ODO caters to general aviation activities and the majority of its operations fall in this category.
- **Military** – operations conducted by aircraft and helicopters with a military designation.

Due to the absence of an airport traffic control tower (ATCT) at the airport, it can be difficult to maintain an accurate count of the airport's operations. An estimated account of annual activity is available via the FAA's Form 5010, *Airport Master Record* for ODO. The Form 5010 also provides a breakdown of estimated operation totals for the airport by type. The most current data, which is reflective of operations for 12 months ending 01/04/2018, estimates that ODO had approximately 78,000 operations in 2020, as detailed in **Table 5**.

TABLE 5 | ODO Annual Operations

AIRCRAFT OPERATIONS	
Itinerant	
Air Carrier	0
Air Taxi & Commuter	0
GA	26,000
Military	0
Subtotal	26,000
Local	
GA	52,000
Military	0
Subtotal	52,000
TOTAL	78,000

Source: FAA Form 5010, *Airport Master Record*

BASED AIRCRAFT

Identifying the current number of based aircraft is an important part of the planning process; however, it can be challenging to be accurate given the transient nature of aircraft storage. ODO maintains an inventory record of based aircraft at the airport which accounts for 108 based aircraft; however, only 88 of those aircraft have been validated by the FAA as of 05/20/2021.

ENVIRONMENTAL FEATURES

Research has been conducted on 14 environmental impact categories outlined within FAA's Order 1050.1F, *Environmental Impacts: Policies and Procedures* (July 2015). Available information regarding the existing conditions at ODO was derived from internet resources, agency maps, and existing literature. The intent of this task is to catalog potential environmental sensitivities that might affect future improvements at the airport.

AIR QUALITY

The concentration of various pollutants in the atmosphere describes the local air quality. The significance of a pollutant's concentration is determined by comparing it to the state and federal air quality standards. In 1971, the U.S. Environmental Protection Agency (EPA) established standards that specify the maximum permissible short- and long-term concentrations of various air contaminants. The National Ambient Air Quality Standards (NAAQS) consist of primary and secondary standards for criteria pollutants: ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), coarse particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), and lead (Pb).

Based on federal air quality standards, a specific geographic area can be classified as either an "attainment," "maintenance," or "nonattainment" area for each pollutant. The threshold for nonattainment designation varies by pollutant.

The airport is in Ector County, Texas. Ector County is in attainment for all criteria pollutants.[3]

BIOLOGICAL RESOURCES

Biotic resources include the various types of plants and animals that are present in an area. The term also applies to rivers, lakes, wetlands, forests, and other habitat types that support plants and animals.

The U.S. Fish and Wildlife Service (USFWS) is charged with overseeing the requirements contained within Section 7 of the *Endangered Species Act* (ESA). The ESA provides a framework to conserve and protect animal or plant species whose populations are threatened by human activities. The FAA and USFWS review projects to determine if a significant impact to protected species will result in the implementation of a proposed project. Significant impacts occur when a proposed action could jeopardize the continued existence of a protected species or would result in the destruction or adverse modification of federally designated critical habitat in the area. The USFWS's Information for Planning and Consultation (IPaC) resource list describes species and habitat protected under ESA within the vicinity of the airport (**Table 6**).

Section 3 of the ESA is used to protect critical habitat areas. Designated critical habitat areas are geographically defined and have been determined to be essential to the recovery of a specific species. There is no federally designated critical habitat at the airport.

There is potential for avian concerns for areas at the airport listed in the IPaC. Habitat for migratory birds may occur if bushes or other ground nesting substrate is present.

[3] Texas Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants | Green Book | US EPA Texas Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants | Green Book | US EPA

Table 6 | Species Protected Under ESA Section 7 with Potential to Occur at the Airport

Common Name (*Scientific Name*)	Federal Status	Habitat and Range	Potential for Occurrence
Northern Aplomado Falcon (Falco femoralis septentrionalis)	Endangered	Open grassland or savannah habitat with scattered trees or shrubs.	Potential. Foraging or nesting habitat (such as trees) may be present at the airport. Additional habitat surveys may be necessary to determine the presence of this species.
Piping Plover (Charadrius melodus)	Threatened	Coastal habitats include sand spits, small islands, tidal flats, shoals and sandbars with inlets. Primary foraging habitats include sandy mud flats, ephemeral pools	None. There is no supporting habitat located within the vicinity of the airport.
Red Knot (Calidris canutus rufa)	Threatened	Sandy beaches, saltmarshes, lagoons, mudflats of estuaries and bays, and mangrove swamps that contain an abundance of invertebrate prey. Other habitats that might harbor knots include peat banks (remnants of ancient forest on the seashore, exposed by erosion), salt ponds, eelgrass beds, and Brazilian resting (coastal spits).	None. There is no supporting habitat located within the vicinity of the airport.
Monarch butterfly *(Danaus plexippus)*	Candidate	Monarchs feed exclusively on the leaves of milkweed. During winter Monarchs cluster together in colonies and root in forests in elevations up to 3,600 meters.	Potential. Individuals may occur seasonally as a potential migratory stopover. Additional habitat surveys may be necessary to determine the presence of this species.

Source: USFWS IPaC (IPaC: Home (fws.gov))

CLIMATE

Increasing concentrations of greenhouse gases (GHG) can affect global climate by trapping heat in Earth's atmosphere. Scientific measurements have shown that Earth's climate is warming with concurrent impacts, including warmer air temperatures, rising sea levels, increased storm activity, and greater intensity in precipitation events. Climate change is a global phenomenon that can also have local impacts. GHGs, such as water vapor (H_2O), carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and O_3, are both naturally occurring and anthropogenic (man-made). The research has established a direct correlation between fuel combustion and GHG emissions. GHGs from anthropogenic sources include CO_2, CH_4, N_2O, hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF6). CO_2 is the most important anthropogenic GHG because it is a long-lived gas that remains in the atmosphere for up to 100 years.[4]

The U.S. EPA's *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2020* shows total transportation emissions, including aviation, decreased largely due to coronavirus (COVID-19) and the combined impacts of long-term trends in population, economic growth, energy markets, technological changes, and changes in energy efficiency. The inventory included aviation as a part of the 13.3 percent decrease in transportation sector GHG emissions leading up to 2020.[5]

Information regarding the climate for the airport and surrounding environments, including wind, temperature, and precipitation, are found earlier in this ALP Update and Narrative.

[4] Intergovernmental Panel on Climate Change AR5 Synthesis Report: Climate Change 2014 (http://www.ipcc.ch/)
[5] Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2020 https://www.epa.gov/system/files/documents/2022-04/us-ghg-inventory-2022-main-text.pdf

Currently, the state of Texas has not implemented a state climate action plan recognized by the Center for Climate and Energy Solutions.[6] Larger cities neighboring Odessa have implemented climate action, equity, and resilience plans. The City of Odessa does not have a drafted Climate Action Plan.

COASTAL RESOURCES

Federal activities involving or affecting coastal resources are governed by the *Coastal Barriers Resource Act*, the *Coastal Zone Management Act*, and Executive Order (E.O.) 13089, *Coral Reef Protection*.

The airport is not located within a coastal zone. The closest National Marine Sanctuary is the Flower Garden Bank National Marine Sanctuary, located 548 miles away.[7]

DEPARTMENT OF TRANSPORTATION ACT, SECTION 4(f)

Section 4(f) of the *Department of Transportation Act,* which was recodified and renumbered as Section 303(c) of 49 United States Code, provides that the Secretary of Transportation will not approve any program or project that requires the use of any publicly or privately owned historic sites, public parks, recreation areas, or waterfowl and wildlife refuges of national, state, regional, or local importance unless there is no feasible and prudent alternative to the use of such land, and the project includes all possible planning to minimize harm resulting from the use.[8]

Table 7 lists potential Section 4(f) resources within two miles of the airport. School playgrounds may be considered a Section 4(f) resource if the recreational facilities at the school are readily available to the public.

Table 7 | U.S. Dept. of Transportation Section 4(f) Resources Within Two Miles of the Vicinity of the Airport

Place	Distance from Airport (miles)	Direction from Airport
Schools		
Alternative Education Center	0.2	Southeast
Jordan Elementary School	1.2	North
Ross Elementary	1.7	Southeast
Ireland Elementary	2.0	Southeast
Dr. Lee Buice Elementary	0.4	Northeast
Public Recreational Facilities/Nature Preserves		
Lawndale Park	1.2	Northwest
Dorothy L. Murphy Park	1.2	Southwest
Sherwood Park	1.5	South
Ratliff Ranch Golf Course	0.8	East
Sunset Golf & Country Club	1.2	Northwest
Ratliff Stadium and Athletic Fields	0.4	East

Source: Google Earth Aerial Imagery (May 2022); Coffman Associates analysis

[6] U.S. State Climate Action Plans — Center for Climate and Energy Solutions (c2es.org)
[7] Google Earth Aerial Imagery (May 2022)
[8] 49 U.S. Code § 303 - Policy on lands, wildlife and waterfowl refuges, and historic sites

Significant historic resources are also protected under Section 4(f). The closest NRHP feature is White-Pool House, located five miles from the airport.

The I-20 Wildlife Preserve & Jenna Welch Nature Study Center is 16 miles northeast of the airport. The I-20 wildlife preserve is a 100-acre riparian forest campus. The reserve protects Midland's urban playa habitat including wetlands, floodplain thickets, prairie grassland that home various species of wildlife.

Nearest wilderness and national recreation areas are listed below:

- Nearest Wilderness Area: Carlsbad Caverns Wilderness (121 miles from the airport)
- Nearest National Recreation Area: Amistad National Recreation Area (170 miles from airport)
- Nearest Wildlife Refuge: (Muleshoe National Wildlife Refuge (139 miles from airport)

FARMLANDS

Under the *Farmland Protection Policy Act* (FPPA), federal agencies are directed to identify and consider the adverse effects of federal programs on the preservation of farmland, to consider appropriate alternative actions which could lessen adverse effects, and to assure that such federal programs are, to the extent practicable, compatible with state or local government programs and policies to protect farmland. The FPPA guidelines, developed by the U.S. Department of Agriculture (USDA), apply to farmland classified as prime, unique, or of state or local importance as determined by the appropriate government agency, with concurrence by the Secretary of Agriculture.

NRCS Web Soil Survey farmland classification shows the following types of soils within the vicinity of the airport: "Not prime farmland."

Table 8 lists each soil type in the airport area based on information obtained from the USDA Natural Resources Conservation Service's (NRCS) Web Soil Survey (WSS). Most of the airport is classified as KSA (Kimbrough-Stegall association) with a small strip of other soils along the airport property line abutting US Highway 385.

Table 8| Farmland Classification

Map unit symbol	Map unit name	Rating
Kb	Kimbrough-Urban Land complex	Not prime farmland
KSA	Kimbrough-Stegall association, nearly level	Not prime farmland
M-W	Miscellaneous water	Not prime farmland
Ra	Ratliff-Urban land complex	Not prime farmland
Summary by Map Unit Ector and Crane Counties, Texas (TX606)		

Source: USDS Web Soil Survey (https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx)

HAZARDOUS MATERIALS, SOLID WASTE, AND POLLUTION PREVENTION

Federal, state, and local laws regulate hazardous materials use, storage, transport, and disposal. These laws may extend to past and future landowners of properties containing these materials. In addition, disrupting sites containing hazardous materials or contaminants may cause significant impacts to soil, surface water, groundwater, air quality, and the organisms using these resources. According to the U.S. EPA's *EJSCREEN*, there are no Superfund or brownfields sites within three miles of the airport.

National Pollutant Discharge Elimination System (NPDES) permits outline the regulatory requirements of municipal storm water management programs and establish requirements to help protect the beneficial uses of the receiving waters. They require permittees to develop and implement Best Management Practices (BMPs) to control/reduce the discharge of pollutants to waters of the United States to the maximum extent practicable (MEP). Texas manages the NPDES for the state under the guidance of the U.S. EPA.

HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Determination of a project's environmental impact to historic and cultural resources is made under guidance in the *National Historic Preservation Act* (NHPA) *of 1966*, as amended, the *Archaeological and Historic Preservation Act* (AHPA) *of 1974*, the *Archaeological Resources Protection Act* (ARPA), and the *Native American Graves Protection and Repatriation Act* (NAGPRA) *of 1990*. In addition, the *Antiquities Act of 1906*, the *Historic Sites Act of 1935*, and the *American Indian Religious Freedom Act of 1978* also protect historical, architectural, archaeological, and cultural resources. Impacts may occur when a proposed project causes an adverse effect on a resource which has been identified (or is unearthed during construction) as having historical, architectural, archaeological, or cultural significance.

Sections 14-3-1, 14-3-2 and 14-3-3 of the City of Odessa, Texas Zoning Ordinance includes Historical Preservation Regulations and applications for designation of historical landmarks or districts in Odessa.[9] The airport may still have buildings dating to the early 1970s or older. Such structures could be considered historic resources (i.e., 50 years or older) and should be evaluated for historic significance if proposed for demolition or alteration. Most of the surface area of the airport has been previously disturbed and the potential for intact prehistoric resources on the ground surface appears low.

LAND USE

Land use regulations near airports are achieved through local government codes, city policies, and plans that include airport districts and planning areas. Regulations are used to avoid land use compatibility conflict around airports.

Based on the City of Odessa Zoning Map, ODO is considered a light industrial land use and is surrounded by single family residential, open space, commercial, and light industrial land uses. Light Industrial zoning is present on and around the airport on the west, south, and east as far as Dawn Avenue. Commercial and light industrial land uses immediately surround the airport's facilities on the west and south. The

[9] Zoning Ordinance (odessa-tx.gov) https://www.odessa-tx.gov/DocumentCenter/View/1433/New-Zoning-Ordinance---City-of-Odessa-Texas-PDF

airport is also adjacent to residences on the north, east and southeast boundaries, and is in proximity to a new subdivision located on Dawn Avenue. The Ratliff golf course, stadium, softball and soccer fields, and tennis courts are less than 0.5 mile from the airport property on the east side. There are several schools within two miles of the airport (see **Table 7** and **Exhibit 10**)

Section 14-8-2 in the city's zoning ordinance includes specific height restrictions based on land use, but states that buildings in the Light Industrial District can be constructed to "any legal height not restricted by other laws or ordinances." In addition, the city's performance standards for Light Industrial Districts provide an exemption for transient noise of moving sources such as automobiles, trucks, and airplanes (Section 14-4-2 [4][D).

NATURAL RESOURCES AND ENERGY SUPPLY

Natural resources and energy supply provide an evaluation of a project's consumption of natural resources. It is the policy of FAA Order 1053.1C, *Energy and Water Management Program for FAA Buildings and Facilities*, to encourage the development of facilities that exemplify the highest standards of design, including principles of sustainability.

Odessa Water, through Odessa Utilities Department, provides water for about 97,802 residents living in the Odessa area. Established in 1881, Odessa Water purchases all its water, untreated, from the Colorado River Municipal Water District (CRMWD). The majority of the water is surface water from Lake Ivie (Runnels County), Lake Thomas (Scurry County), and Lake Spence (Coke County). Groundwater or well water from Ward and Martin Counties wells are also pumped to meet the water system demands.[10]

NOISE AND NOISE COMPATIBLE LAND USE

Federal land use compatibility guidelines are established under 14 Code of Federal Regulations (CFR) Part 150, *Airport Noise Compatibility Planning*. According to 14 CFR Part 150, residential land and schools are noise-sensitive land uses that are not considered compatible with a 65 decibel (dB) Day-Night Average Sound Level (Ldn or DNL)[11]. Other noise-sensitive land uses (such as religious facilities, hospitals, or nursing homes), if located within a 65 dB DNL contour, are generally compatible when an interior noise level reduction of 25 dB is incorporated into the design and construction of the structure. Special consideration should also be given to noise-sensitive areas within Section 4(f) properties where the land use compatibility guidelines in 14 CFR Part 150 do not account for the value, significance, and enjoyment of the area in question.[12]

Table 9 shows noise-sensitive land uses within two miles of the airport. The nearest hospital/medical center, Odessa Regional Medical Center, is five miles south of the airport.

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[10] Odessa Utilities Department https://waterzen.com/water-providers/odessa-water/
[11] The DNL accounts for the increased sensitivity to noise at night (10:00 PM to 7:00 AM) and is the metric preferred by FAA, the U.S. EPA, and the U.S. Department of Housing and Urban Development as an appropriate measure of cumulative noise exposure.
[12] 49 U.S. Code § 47141 – Compatible land use planning and projects by State and Local Governments

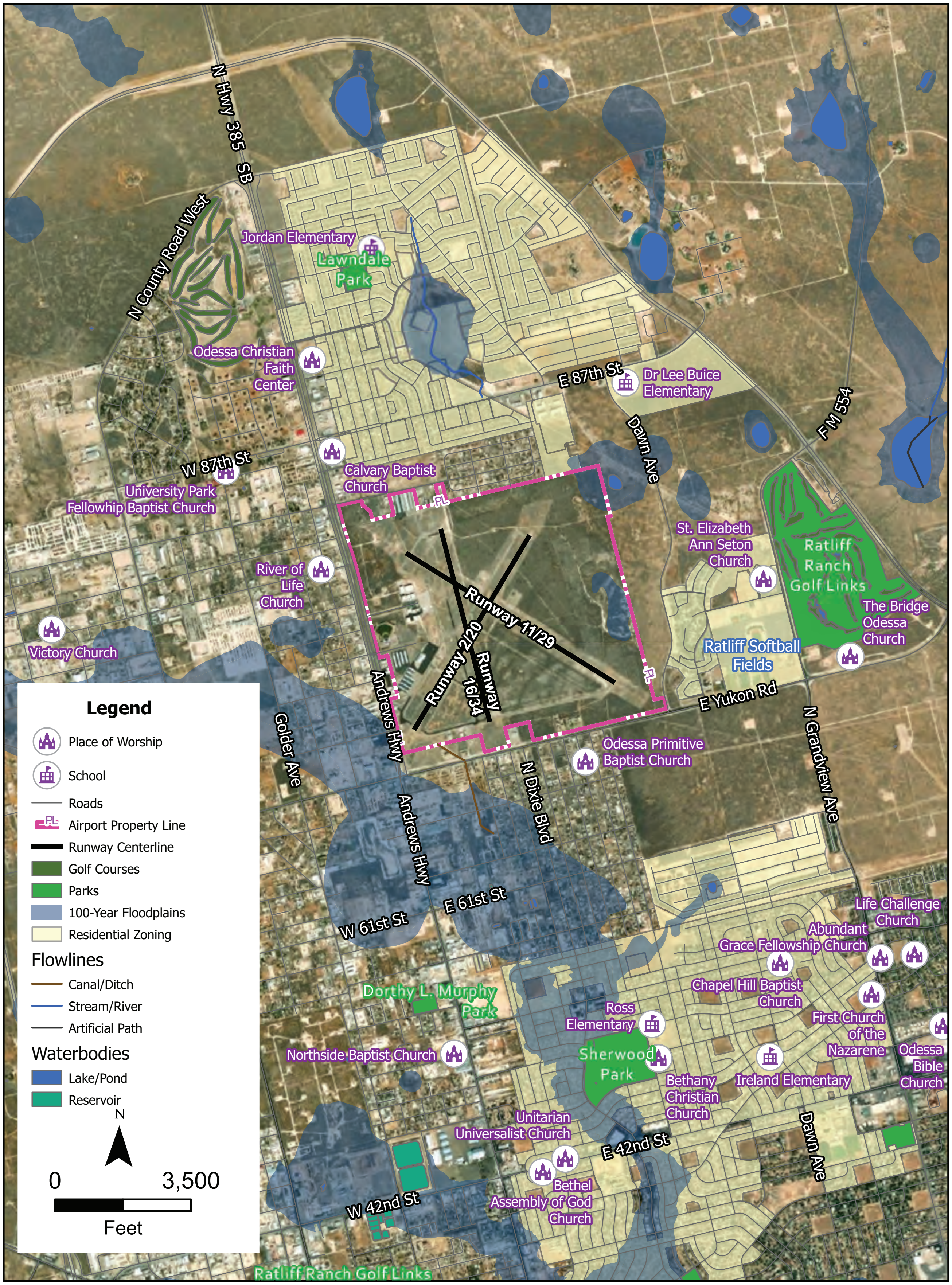

N Hwy 385 SB
N County Road West
Jordan Elementary
Lawndale Park
Odessa Christian Faith Center
E 87th St
Dr Lee Buice Elementary
Dawn Ave
FM 554
W 87th St
Calvary Baptist Church
University Park Fellowship Baptist Church
St. Elizabeth Ann Seton Church
Ratliff Ranch Golf Links
River of Life Church
Runway 11/29
Runway 2/20
Runway 16/34
The Bridge Odessa Church
Victory Church
Ratliff Softball Fields
E Yukon Rd
Andrews Hwy
Golder Ave
Odessa Primitive Baptist Church
N Dixie Blvd
N Grandview Ave
Legend
Place of Worship
School
Roads
Airport Property Line
Runway Centerline
Golf Courses
Parks
100-Year Floodplains
Residential Zoning
Flowlines
Canal/Ditch
Stream/River
Artificial Path
Waterbodies
Lake/Pond
Reservoir
N
0
3,500
Feet
W 61st St
E 61st St
Life Challenge Church
Abundant
Grace Fellowship Church
Chapel Hill Baptist Church
Dorthy L. Murphy Park
Ross Elementary
First Church of the Nazarene
Sherwood Park
Northside Baptist Church
Odessa Bible Church
Bethany Christian Church
Ireland Elementary
Unitarian Universalist Church
E 42nd St
Dawn Ave
Bethel Assembly of God Church
W 42nd St
Ratliff Ranch Golf Links

Table 9 | Noise-Sensitive Land Uses within Two Miles of Airport

Facility	Distance from Airport (Miles)	Direction from Airport
Schools		
Alternative Education Center	0.2	Southeast
Jordan Elementary School	1.2	North
Ross Elementary	1.7	Southeast
Ireland Elementary	2.0	Southeast
Dr. Lee Buice Elementary	0.4	Northeast
Worship		
University Park Fellow Baptist Church	1.0	Northwest
Calvary Baptist Church	0.3	Northeast
Odessa Primitive Baptist Church	0.2	South
Unitarian Universalist Church	2.0	South
Northside Baptist Church	1.5	South
Bethany Christian Church	1.6	South
River of Life Church	0.2	West
St. Elizabeth Ann Seton Church	0.9	East
The Bridge Odessa	1.2	East
Odessa Christian Faith Center	1.0	Northeast
Life Challenge Church	2.1	Southeast

SOCIOECONOMICS, ENVIRONMENTAL JUSTICE, AND CHILDREN'S ENVIRONMENTAL HEALTH AND SAFETY RISKS

Socioeconomics | Socioeconomics is an umbrella term used to describe aspects of a project that are either social or economic in nature. A socioeconomic analysis evaluates how elements of the human environment such as population, employment, housing, and public services might be affected by the proposed action and alternative(s).

FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures* specifically requires that a federal action causing disproportionate impacts to an environmental justice population (i.e., a low-income or minority population), be considered, as well as an evaluation of environmental health and safety risks to children. The FAA has identified factors to consider when evaluating the context and intensity of potential environmental impacts.

Would the proposed action:

- induce substantial economic growth in an area, either directly or indirectly;
- disrupt or divide the physical arrangement of an established community;
- cause extensive relocation when sufficient replacement housing is unavailable;
- cause extensive relocation of community business what would cause severe economic hardship for affected communities;
- disrupt local traffic patterns and substantially reduce the levels of service of roads serving an airport and its surrounding communities; or
- produce a substantial change in the community tax base?

Environmental Justice | Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental, and commercial operations or policies.

Meaningful Involvement ensures that:

- people have an opportunity to participate in decisions about activities that may affect their environment and/or health;
- the public's contribution can influence the regulatory agency's decision;
- their concerns will be considered in the decision-making process; and
- the decision-makers seek out and facilitate the involvement of those potentially affected.[13]

The closest residential area is immediately adjacent to the airport boundary. The airport is adjacent to low-income residences (trailers or mobile homes) on two sides including the north and south boundary and is in proximity to a residential subdivision off Dawn Avenue on the east side. According to 2019 American Community survey estimates, the population within one mile of the airport is 11,865 persons, of which 27 percent is considered low-income and 56 percent is considered a minority population. As indicated in **Table 10**, approximately 51 percent of the population has identified as Hispanic or Latino.

Table 10 | Population Characteristics Within One Mile of the Airport

Characteristic	
Total Population	11,865
Population by Race	
White	79%
Black	1%
American Indian	0%
Asian	3%
Pacific Islander	0%
Some Other Race	14%
Population Reporting Two or More Races	0%
Total Hispanic population	51%

Source: U.S. EPA EJSCREEN ACS Summary Report (2019); Coffman Associates analysis (2022)

Children's Environmental Health and Safety | Federal agencies are directed, per E.O. 13045, Protection of Children from Environmental Health Risks and Safety Risks, to make it a high priority to identify and assess the environmental health and safety risks that may disproportionately impact children. Such risks include those that are attributable to products or substances that a child is likely to encounter or ingest (air, food, water – including drinking water) or to which they may be exposed.

[13] Environmental Justice EPA https://www.epa.gov/environmentaljustice

According to the U.S. EPA EJSCREEN report, approximately 30 percent of the population within the one-mile study area previously identified is under the age of 17. This equated to 3,618 children in 2019. See **Table 9** for a list of schools and recreational facilities that are used by children within a two-mile radius of the airport.

VISUAL EFFECTS

Visual effects deal broadly with the extent to which a proposed action or alternative(s) would either (1) produce light emissions that create an annoyance or interfere with activities; or (2) contrast with, or detract from, the visual resources and/or the visual character of the existing environment. Each jurisdiction will typically address outdoor lighting, scenic vistas, and scenic corridors in zoning ordinances and their general plan.

Light Emissions | Light emission impacts typically relate to the extent to which any light or glare results from a source that could create an annoyance for people or would interfere with normal activities. Generally, local jurisdictions will include ordinances in the local code addressing outdoor illumination to reduce the impact of light on surrounding properties.

Existing light emission sources associated with ODO include airfield lighting and terminal/landside lighting. Airfield lighting includes lighting directly at or on the airfield system, such as runway and taxiway lighting.

Visual Resources and Visual Character | Visual character refers to the overall visual makeup of the existing environment where a proposed action or its alternative(s) would be located. For example, locations near densely populated areas generally have a visual character that could be defined as urban, whereas less developed areas could have a visual character defined by the surrounding landscape features, such as open grass fields, forests, mountains, deserts, etc.

Visual resources include buildings, sites, traditional cultural properties, and other natural or manmade landscape features that are visually important or have unique characteristics. Visual resources may include structures or objects that obscure or block other landscape features. In addition, visual resources can include the cohesive collection of various individual visual resources that can be viewed at once or in concert from the area surrounding the site of the proposed action or alternative(s).

The National Scenic Byways Program is a voluntary, community-based program administered through the Federal Highway Administration to recognize, protect, and promote America's designated scenic routes. It is reported by the U.S. Department of Transportation and Federal Highways Administration, that the State of Texas is not on the national byways map.[14] Currently, Texas does have some protected highways not considered as "scenic" but are protected from new signage.[15]

[14] Preserve Texas Scenic Highways | Scenic Texas https://www.scenictexas.org/resources/scenic-highways
[15] Prohibition of Signs on Certain Highways (txdot.gov) https://ftp.txdot.gov/pub/txdot-info/row/scenic_prohibited.pdf

WATER RESOURCES

Wetlands | The U.S. Army Corps of Engineers regulates the discharge of dredged and/or fill material into waters of the United States, including adjacent wetlands, under Section 404 of the *Clean Water Act* (CWA). Wetlands are defined in E.O. 11990, *Protection of Wetlands*, as "those areas that are inundated by surface or groundwater with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction." Wetlands can include swamps, marshes, bogs, sloughs, potholes, wet meadows, river overflows, mudflats, natural ponds, estuarine areas, tidal overflows, and shallow lakes and ponds with emergent vegetation. Wetlands exhibit three characteristics: the soil is inundated or saturated to the surface at some time during the growing season (hydrology), has a population of plants able to tolerate various degrees of flooding or frequent saturation (hydrophytes), and soils that are saturated enough to develop anaerobic (absent of air or oxygen) conditions during the growing season (hydric).

USFWS manages the National Wetlands Inventory on behalf of all federal agencies. The National Wetlands Inventory identifies surface waters and wetlands in the nation. The inventory and environmental sensitives exhibit (**Exhibit 10**) indicate a few Freshwater Emergent Wetlands directly outside of the northeast boundary of the airport. The nearest wetland is 0.3 miles from the airport. This wetland is temporary flooded through the year. The nearest permanently flooded wetlands are located 1.1 miles southeast of the airport.

Floodplains | E.O. 11988, *Floodplain Management*, directs federal agencies to take action to reduce the risk of flood loss, minimize the impact of floods on human safety, health, and welfare, and restore and preserve the natural and beneficial values served by the floodplains. A review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) panel number 29105C0219C, effective September 2010, indicates that there are no Special Flood Hazard Areas such as a 100-year floodplain on the airport.[16]

The FEMA Flood Map Service Center indicates the airport property is not within a 100-year flood zone. The selected flood map boundaries, Panel 48135C0220E (effective date 3/15/2012) and 48135C0240E (effective date 3/15/2012), show special flood hazard within and around the vicinity of the airport. These flood hazard areas are located east and southwest of the airport and are identified on **Exhibit 10**.

Surface Waters | The *Clean Water Act* (CWA) establishes water quality standards, controls discharges, develops waste treatment management plans and practices, prevents or minimizes the loss of wetlands, and regulates other issues concerning water quality. Water quality concerns related to airport development most often relate to the potential for surface runoff and soil erosion, as well as the storage and handling of fuel, petroleum products, solvents, etc. Additionally, Congress has mandated (under the CWA) the National Pollutant Discharge Elimination System (NPDES).

ODO is located in the Antelope Lake-Muskingam Draw Watershed. The nearest river is Beals Creek, 51 miles northeast of the airport. The nearest impaired watershed under Section 303 of the CWA is a segment of the Colorado River, 85 miles northeast of the airport.[17]

[16] Federal Emergency Management Agency *Flood Map Service Center* https://msc.fema.gov/portal/home
[17] EPA EJSCREEN – Water features https://www.epa.gov/ejscreen

Groundwater | Groundwater is subsurface water that occupies the space between sand, clay, and rock formations. The term aquifer is used to describe the geologic layers that store or transmit groundwater, such as wells, springs, and other water sources. Examples of direct impacts to groundwater could include withdrawal of groundwater for operational purposes or reduction of infiltration or recharge area due to new impervious surfaces.[18]

The EPA's Sole Source Aquifer (SSA) Program was established under Section 1424(e) of the Safe Drinking Water Act (SDWA). Since 1977, it has been used by communities to help prevent contamination of groundwater from federally funded projects. It has increased public awareness of the vulnerability of groundwater resources. The SSA program is authorized by Section 1424(e) of the Safe Drinking Water Act of 1974 (Public Law 93-523, 42 U.S.C. 300 et. seq), which states:

"If the Administrator determines, on his own initiative or upon petition, that an area has an aquifer which is the sole or principal drinking water source for the area and which, if contaminated, would create a significant hazard to public health, he shall publish notice of that determination in the Federal Register."[19]

According to the U.S. EPA Sole Source Aquifer for Drinking Water website, there are no sole source aquifers located within airport boundaries. The nearest sole source aquifer, Edwards Aquifer I (San Antonio Area) SSA - Streamflow Source Area, is located 169 miles from the airport. [20]

Wild and Scenic Rivers | The *National Wild and Scenic Rivers Act* was established to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations.

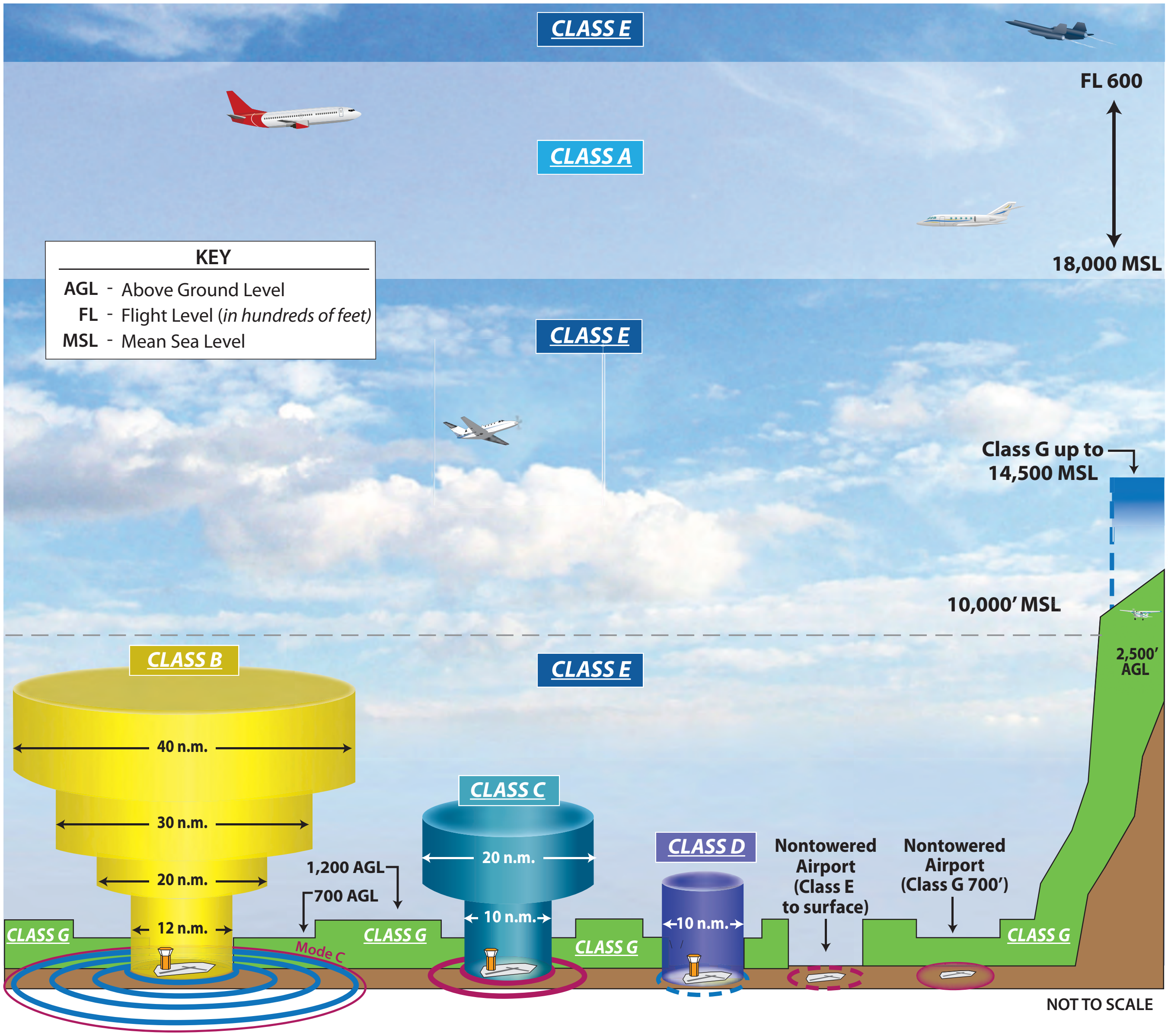
The Nationwide River Inventory (NRI) is a list of over 3,400 rivers or river segments that appear to meet the minimum *Wild and Scenic Rivers Act* eligibility requirements based on their free-flowing status and resource values. The development of the NRI resulted from Section 5(d)(1) in the *Wild and Scenic Rivers Act*, directing Federal agencies to consider potential wild and scenic rivers in the comprehensive planning process.

The closest designated wild and scenic river identified is the Rio Grande River, located 140 miles east of the airport.[21] The nearest National River Inventory feature is Pecos River, located 94 miles away.

AIRSPACE CHARACTERISTICS

The airspace within the National Air Transportation System (NAS) is divided into six different categories or classes. The airspace classifications that make up the NAS are presented on **Exhibit 11**. These categories of airspace are made up of Classes A, B, C, D, E, and G airspace. Each class of airspace contains its own criteria that must be met in terms of required aircraft equipment, operating flight rules (visual or

[18] United States Geological Survey - What is Groundwater? https://www.usgs.gov/faqs/what-groundwater
[19] Overview of the Drinking Water Sole Source Aquifer Program | US EPA https://www.epa.gov/dwssa/overview-drinking-water-sole-source-aquifer-program#Authority
[20] Interactive Map for Sole Source Aquifers Sole Source Aquifers (arcgis.com)
[21] Nationwide Rivers Inventory – Rivers https://www.rivers.gov/california.php



DEFINITION OF AIRSPACE CLASSIFICATIONS

CLASS A Think A - Altitude. Airspace above 18,000 feet MSL up to and including FL 600. Instrument Flight Rule (IFR) flights only, ADS-B 1090 ES transponder required, ATC clearance required.

CLASS B Think B - Busy. Multi-layered airspace from the surface up to 10,000 feet MSL surrounding the nation's busiest airports. ADS-B 1090 ES transponder required, ATC clearance required.

CLASS C Think C - Mode C. Mode C transponder required. ATC communication required. Generally airspace from the surface to 4,000 feet AGL surrounding towered airports with service by radar approach control.

CLASS D Think D - Dialogue. Pilot must establish dialogue with tower. Generally airspace from the surface to minimum 2,500 feet AGL surrounding towered airports.

CLASS E Think E - Everywhere. Controlled airspace that is not designated as any other Class of airspace.

CLASS G Think G - Ground. Uncontrolled airspace. From surface to a 1,200 AGL (in mountainous areas 2,500 AGL) Exceptions: near airports it lowers to 700' AGL; some airports have Class E to the surface. Visual Flight Rules (VFR) minimums apply.

Source: www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak/media/15_phak_ch15.pdf instrument flight rules), and procedures. Classes A, B, C, D, and E are considered controlled airspace, which requires pilot communication with the controlling agency prior to airspace entry and throughout operation within the designated airspace. Pilot communication procedures, required pilot ratings, and required minimum aircraft equipment vary depending upon the class of airspace, as well as the type of flight rules in use.

As shown on **Exhibit 12**, ODO is located on the western edge of Midland Class C airspace, which extends from 4,600 feet mean sea level (MSL) up to 6,900 feet MSL. Class E airspace, which extends from 700 feet above ground level (AGL) to the floor of Class C airspace, abuts the outer ring of Midland Class C airspace. Class G, or uncontrolled airspace, extends from the surface to the base of overlying Class E airspace.

Class C airspace is designed to regulate the flow of uncontrolled traffic above, around, and below the arrival and departure airspace required for high-performance, passenger-carrying aircraft at some commercial service airports. Pilots flying in Class C airspace around ODO must have an aircraft equipped with a two-way radio, an encoding transponder, and have established communication with the ATCT. Aircraft may fly below the floor of the Class C airspace or above the Class C ceiling without establishing communication with ATC.

Exhibit 12 also depicts other airspace features within the vicinity of ODO, including Victor Airways, Restricted Areas, Military Operations Areas (MOAs), Military Training Routes (MTRs), and Alert Areas.

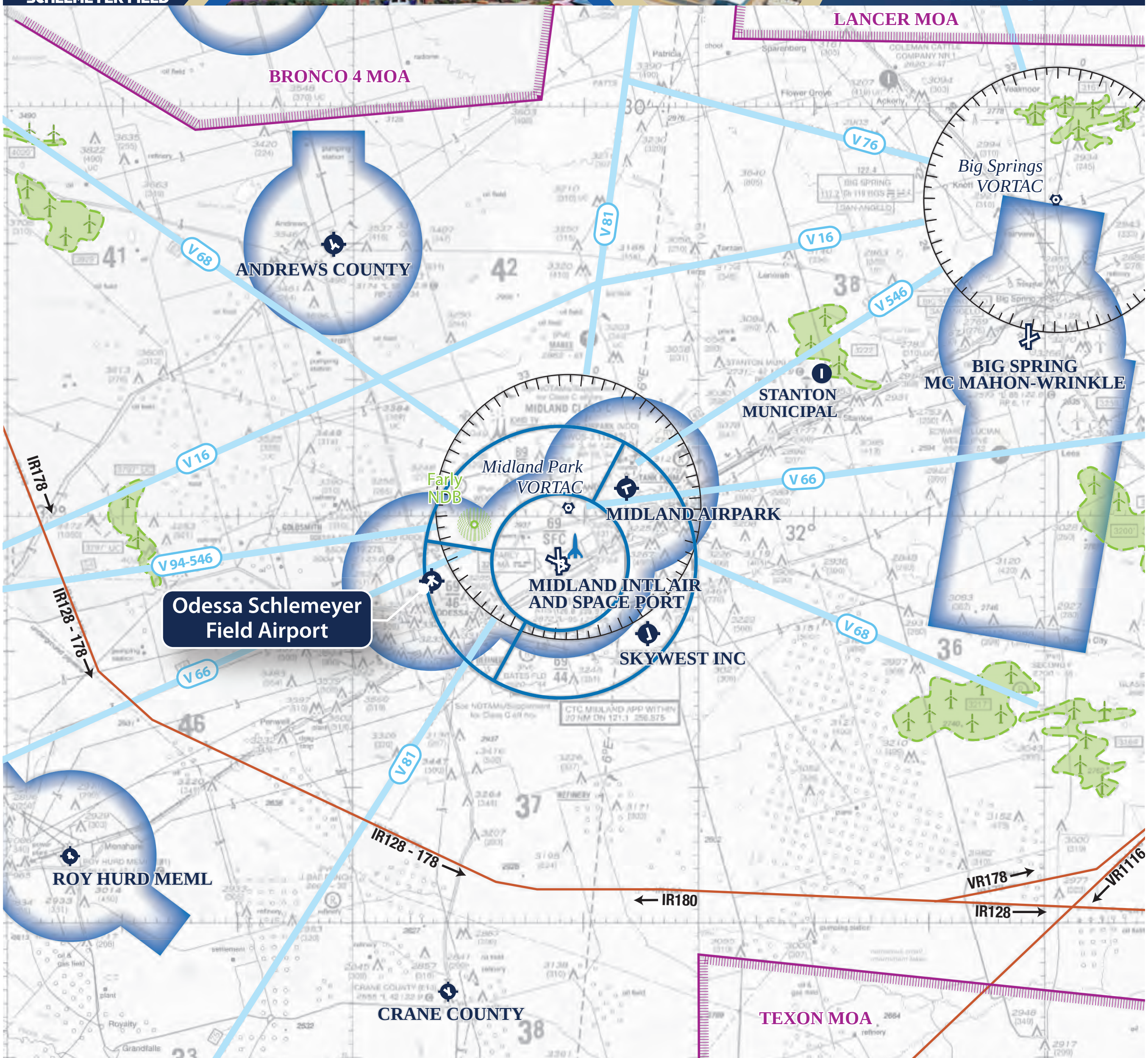
Victor Airways are corridors of airspace extending between VOR facilities that are eight miles wide and extend from 1,200 feet up to, but not including, 18,000 feet. Victor Airways near the airport emanate from the Pecos VOR-DME (V66), the Wink VORTAC (V94-546), and the Fort Stockton VORTAC (V81).

MOAs illustrate airspace where a high level of military activity is conducted and are intended to separate civil and military aircraft. Civilian air travel is not restricted in MOAs, but they are advised to exercise extreme caution when flying within an MOA when military activity is being conducted. There are three MOAs in the vicinity of the airport:

- Bronco 4 MOA – Located approximately 35 nm to the north, the Bronco 4 MOA is operated at 10,000 feet MSL between the hours of 0600 through 1800 Monday through Friday.
- Lancer MOA – Located approximately 46 nm northeast, the Lancer MOA is operated at 6,200 feet MSL Monday through Friday from 0900 to 2400.
- Texon MOA – Located 34 nm southeast of ODO, the Texon MOA is operated at 6,000 feet MSL Monday through Friday from sunrise to sunset.

Other times of operation for each MOA, outside of the listed times of use, are issued by NOTAM. Low level flight training and gunning/missile training is established near the airport at a high frequency and pilots operating in the area should be alert to these training activities.

MTRs are designated airspace that has been generally established for use by high-performance military aircraft to train below 10,000 feet AGL and in excess of 250 knots. There are VR (visual) and IR (instrument) designated MTRs. MTRs with no segment above 1,500 feet AGL will be designated with the VR or



LEGEND

- Airport with hard-surfaced runways 1,500' to 8,069' in length
- Airports with hard-surfaced runways greater than 8,069' or some multiple runways less than 8,069'
- Compass Rose
- Non-directional Radio Beacon (NDB)
- VORTAC
- Military Operations Area (MOA)
- Wind Turbine Farm
- Space Launch Activity Area
- Class C Airspace
- Class E (sfc) Airspace with floor 700 ft. above surface that laterally abuts 1200 ft. or higher Class E airspace
- Victor Airways
- Military Training Routes

NORTH

NOT TO SCALE

Source:
Albuquerque Sectional Chart, US Department of Commerce, National Oceanic and Atmospheric Administration, January 27, 2022

IR, followed by a four-digit number (e.g., VR1116). MTRs with one or more segments above 1,500 feet AGL are identified by the route designation followed by a three-digit number (e.g., IR178). The arrows on the route show the direction of travel.

Restricted airspace is an area of airspace that is typically used by the military in which the local controlling authorities have determined that air traffic must be restricted or prohibited for safety or security concerns. The nearest restricted area (R-6318) is located 130 nm southwest of the airport, which is operated continuously up to 14,000 feet MSL.

Alert Areas are depicted on aeronautical charts to inform nonparticipating pilots of areas that may contain a high volume of pilot training or an unusual type of aerial activity. There are no Alert Areas in the vicinity of the airport.

AIRPORT TRAFFIC CONTROL

There is no airport traffic control tower at ODO; therefore, no formal terminal air traffic control services are available for aircraft landing or departing the airport. Aircraft operating in the airport vicinity are not required to file any type of flight plan or to contact any air traffic control facility unless they are entering airspace where contact is mandatory (i.e., Midland Class C airspace). The common traffic advisory frequency (CTAF) is used by pilots to obtain airport information and to advise other aircraft of their position in the traffic pattern and their intentions.

The airport is located within the jurisdiction of the Fort Worth Air Route Traffic Control Center (ARTCC). The San Angelo flight service station (FSS) provides additional weather data and other pertinent information to pilots in the vicinity of the airport.

REGIONAL AIRPORTS

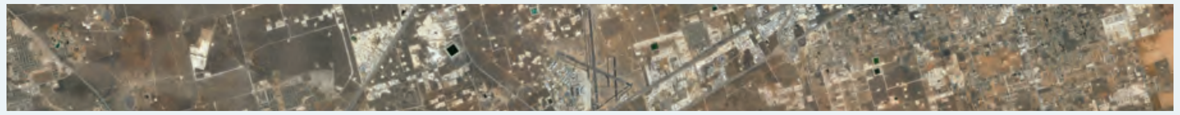
A review of other public-use airports within 30 nm of ODO was conducted to identify and distinguish the types of air service provided in the region. It is important to consider the capabilities and limitations of these airports when planning for future changes or improvements at ODO. Public-use airports within the 30 nm of the airport are detailed in **Exhibit 13**, with information pertaining to each airport obtained from FAA Form 5010-1, *Airport Master Record*.

COMMUNITY PROFILE

For an airport planning study, a profile of the local community including its socioeconomic characteristics is collected and examined to derive an understanding of the dynamics of growth within the study area. Socioeconomic information related to the local area is an important consideration in the master planning process. The community profile for the City of Odessa on **Exhibit 14** is derived from the city's 2016 comprehensive plan, *Envision Odessa*, as well as information sourced from the city's economic development department and Woods & Poole Economics - *Complete Economic and Demographic Data Source*, 2021.

Odessa's population has historically been tied to the boom/bust cycle that occurs in the energy sector. In 2020, the city had a population of 122,630 residents, according to U.S. Census estimates. Current projections for population were not available, but the 2016 *Envision Odessa* report included 5-year projections through 2035, when the population is anticipated to reach 140,322. In terms of the Midland-Odessa combined statistical area, the population is expected to grow at a compound average growth rate of 1.2 percent, which is faster than both the State of Texas and the United States. Key industries in Ector County include oil and gas, construction, transportation, manufacturing, and government. These, along with others, support a labor force of more than 90,000 people.

MIDLAND INTERNATIONAL AIR AND SPACE PORT (MAF)



Distance from ODO	10 mi E
Airport NPIAS Classification	Primary Commercial Service
FAA Asset Study Classification	N/A
Elevation	2,872' MSL
Weather Reporting	ASOS
ATCT	Yes
Annual Operations	58,010
Based Aircraft	106

Primary Runway	16R/34L	10/28	4/22	16L/34R
Length	9,501'	8,302	4,605	4,247
Width	150'	150	75	100
Pavement Strength (pounds)				
SWL	160,000	160,000	30,000	30,000
DWL	200,000	200,000	60,000	60,000
2D	350,000	350,000	NA	NA
2DT	700,000	700,000	NA	NA
Lighting	HIRL	HIRL	MIRL	MIRL
Marking	Precision	Precision	Nonprecision	Basic
Approach Aids	PAPI-4, REILs	PAPI-4, MALS, MALSR	None	None
Instrument Approach Procedures	GPS, HI-VOR	ILS, GPS	GPS	VOR

Services Provided: Jet A & 100LL Fuel; hangars and tiedowns; aircraft maintenance

MIDLAND AIRPARK AIRPORT (MDD)

Distance from ODO	16 mi ENE
Airport NPIAS Classification	GA
FAA Asset Study Classification	Regional
Elevation	2,805' MSL
Weather Reporting	AWOS-3
ATCT	No
Annual Operations	41,010
Based Aircraft	50

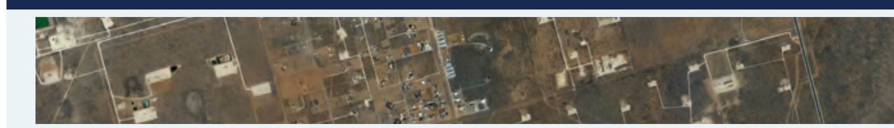
Primary Runway	7/25	16/34
Length	5,571	3,977
Width	75	75
Pavement Strength (pounds)		
SWL	18,500	18,500
DWL	N/A	N/A
Lighting	MIRL	MIRL
Marking	Basic/Nonprecision	Basic/Nonprecision
Approach Aids	PAPI-2; VASI	PAPI-2
Instrument Approach Procedures	GPS; VOR/DME	GPS

Services Provided: Jet A & 100LL Fuel; hangars and tiedowns; aircraft maintenance

KEY

ASOS	Automated Surface Observing System
AWOS	Automated Weather Observing System
ATCT	Air Traffic Control Tower
DWL	Dual Wheel Loading
GA	General Aviation
GPS	Global Positioning System
HIRL	High Intensity Runway Lights
MALS	Medium Intensity Approach Lighting System
MALSR	Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
MIRL	Medium Intensity Runway Lights
MSL	Mean Sea Level
N/A	Not Applicable
NPIAS	National Plan of Integrated Airport Systems
PAPI	Precision Approach Path Indicator
SWL	Single Wheel Loading
VASI	Visual Approach Slope Indicator
VOR	Very High Omnidirectional Range
VOR/DME	Very High Omnidirectional Range with Distance Measuring Equipment

SKYWEST INC AIRPORT (7T7)

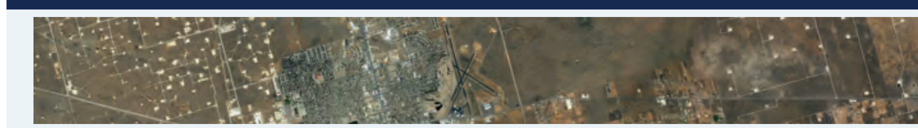


Distance from ODO	16 mi ESE
Airport NPIAS Classification	N/A
FAA Asset Study Classification	N/A
Elevation	2,805' MSL
Weather Reporting	No
ATCT	No
Annual Operations	9,600
Based Aircraft	34

Primary Runway	16/34	6/24
Length	5,000	2,800
Width	42	45
Pavement Strength (pounds)		
SWL	12,500	N/A
DWL	N/A	N/A
Lighting	Nonstandard	None
Marking	Nonstandard	Nonstandard
Approach Aids	None	None
Instrument Approach Procedures	None	None

Services Provided: 100LL Fuel; hangars and tiedowns; aircraft maintenance

ANDREWS COUNTY AIRPORT (E11)

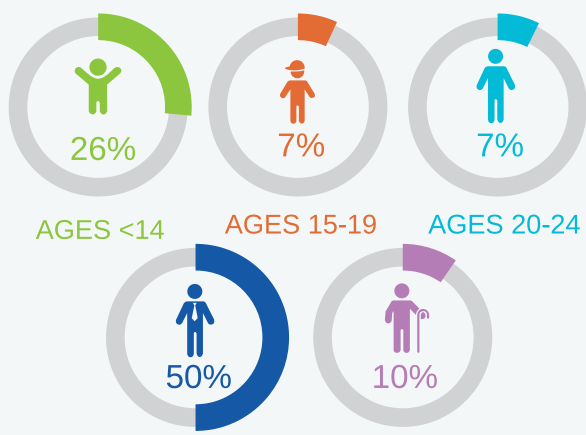


Distance from ODO	26 mi NNW
Airport NPIAS Classification	GA
FAA Asset Study Classification	Local
Elevation	3,174' MSL
Weather Reporting	AWOS-3
ATCT	None
Annual Operations	18,249
Based Aircraft	19

Primary Runway	16/34	2/20	11/29
Length	5,816	3,893	3,048
Width	75	75	75
Pavement Strength (pounds)			
SWL	23,000	23,000	17,000
DWL	37,000	N/A	N/A
Lighting	MIRL	MIRL	N/A
Marking	Nonprecision	Basic	Basic
Approach Aids	PAPI-4	PAPI-4	None
Instrument Approach Procedures	GPS	None	None

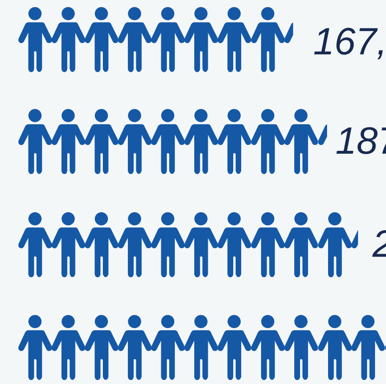
Services Provided: Jet A & 100LL Fuel; tiedowns; aircraft maintenance

POPULATION BY AGE



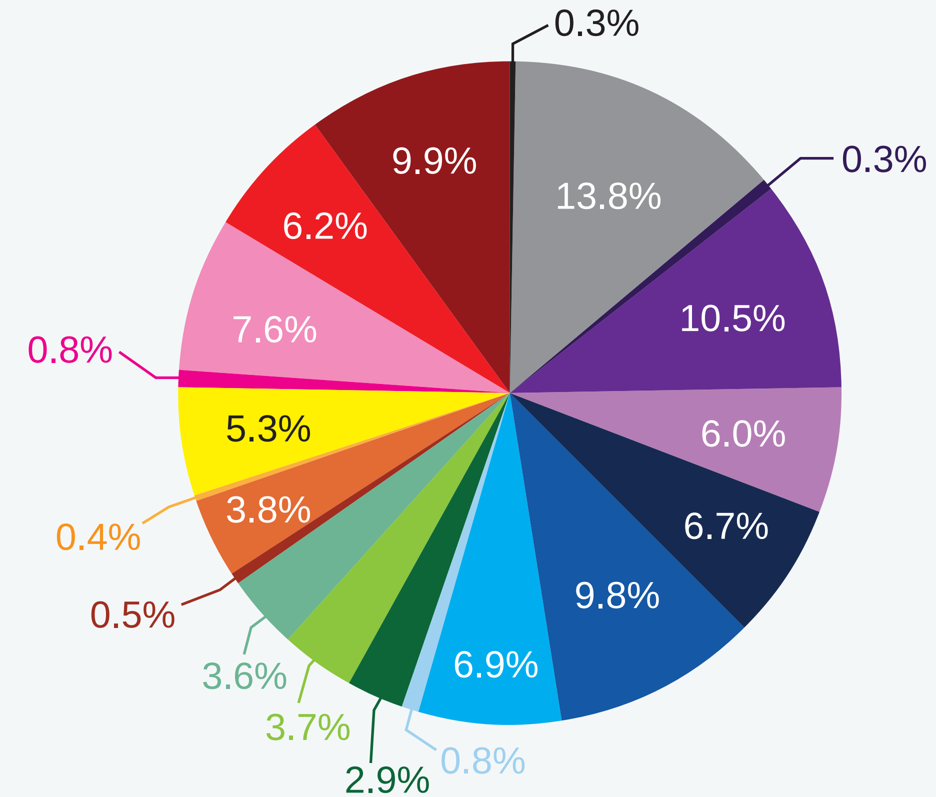
MEDIAN AGE 30.5

ECTOR COUNTY POPULATION



1.2% Growth

EMPLOYMENT BY SECTOR



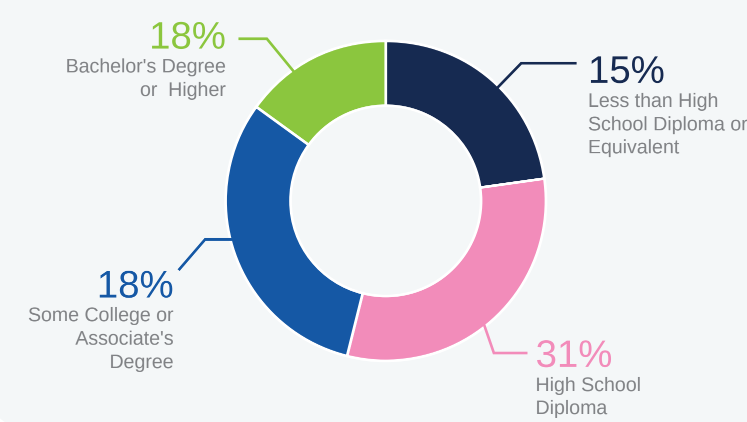
9,029	Government	763	Information
5,653	Other Services, Except Government	6,296	Transportation and Warehousing
6,885	Accommodation and Food Service	8,900	Retail
744	Arts, Entertainment, and Recreation	6,078	Wholesale Trade
4,789	Health Care and Social Assistance	5,495	Manufacturing
373	Educational Services	9,584	Construction
3,464	Administrative and Waste Management	267	Utilities
447	Management and Enterprises	12,515	Mining (Oil & Gas)
3,248	Professional and Technical Services	86	Forestry, Fishing, and Related Activities
3,322	Real Estate and Leasing		Farm Employment
2,664	Finance and Insurance		

Total Employment 90,863

MAJOR EMPLOYERS

- Ector County I.S.D.
- Medical Center Hospital
- Halliburton
- NexTier Complete Solutions
- City of Odessa
- Saulsbury Companies
- Odessa Regional Medical Center
- Ector County
- HEB
- University of Texas Permian Basin

EDUCATION



HOUSEHOLDS

$63,096
MEDIAN HOUSEHOLD INCOME (2020)

$176,900
MEDIAN HOME VALUE (2020)

Note: Data is reflective of Ector County in 2020 unless otherwise noted
Sources: Envision Odessa; City of Odessa Economic Development Department; Woods & Poole Complete Economic and Demographic Data, 2021

AVIATION DEMAND FORECASTS

Facility planning requires a definition of demand that may be expected to occur during the useful life of the facility's crucial components. For ODO, this involves projecting aviation demand for a 20-year timeframe. In this report, forecasts of registered aircraft, based aircraft, based aircraft fleet mix, annual airport operations, and forecasts of airport peaking characteristics are projected.

The forecasts generated may be used for a multitude of purposes, including facility needs assessments and environmental evaluations. The forecasts will be submitted to TxDOT/FAA for review and approval to ensure accuracy and reasonable projections of aviation activity. The intent of the projections is to enable the airport to make facility improvements to meet demand in the most efficient and cost-effective manner possible.

It should be noted that aviation activity can be affected by numerous outside influences on a local, regional, and national level. As a result, forecasts of aviation demand should be used only for advisory purposes. It is recommended that planning strategies remain flexible enough to accommodate any unforeseen facility needs.

FORECASTING APPROACH

Typically, the most accurate and reliable forecasting approach is derived from multiple analytical forecasting techniques. Analytical forecasting methodologies typically consist of regression analysis, trend analysis and extrapolation, market share or ratio analysis, and smoothing. Through the use of multiple forecasting techniques based upon each aviation demand indicator, an envelope of aviation demand projections can be generated.

Regression analysis can be described as a forecasting technique that correlates certain aviation demand variables (such as passenger enplanements or operations) with economic measures. When using regression analysis, the technique should be limited to relatively simple models containing independent variables for which reliable forecasts are available (such as population or income forecasts).

Trend analysis and extrapolation is a forecasting technique that records historical activity (such as airport operations) and projects this pattern into the future. Oftentimes, this technique can be beneficial when local conditions of the study area are differentiated from the region or other airports.

Market share or ratio analysis can be described as a forecasting technique that assumes the existence of a top-down relationship between national, regional, and local forecasts. The local forecasts are presented as a market share of regional forecasts, and regional forecasts are presented as a market share of national forecasts. Typically, historical market shares are calculated and used as a base to project future market shares.

Smoothing is a statistical forecasting technique that can be applied to historical data, giving greater weight to the most recent trends and conditions. Generally, this technique is most effective when generating short-term forecasts.

NATIONAL GENERAL AVIATION TRENDS

The current edition of the FAA *Aerospace Forecasts, Fiscal Years 2021-2041* forecasts the fleet mix and hours flown for single engine piston aircraft, multi-engine piston aircraft, turboprops, business jets, piston and turbine helicopters, light sport, experimental, and others (gliders and balloons). The FAA forecasts "active aircraft," not total aircraft. An active aircraft is one that is flown at least one hour during the year. From 2010 through 2013, the FAA undertook an effort to have all aircraft owners re-register their aircraft. This effort resulted in a 10.5 percent decrease in the number of active general aviation aircraft, mostly in the piston category.

The COVID-19 pandemic has been the biggest factor affecting aviation since March 2020. The effect of the pandemic on the aviation industry has been most devastating to the commercial airline operators, who are still working to recover from staggering losses and add capacity back into networks. However, other segments of the aviation industry, including general aviation such as charters, air taxi, and fractionals, were not impacted quite so much as the airlines. In fact, they appear to have maintained pre-pandemic levels and, in many cases, showed increases in activity. Long-term, the strengths and capabilities developed over the past decade will become evident again. There is confidence that U.S. airlines have finally transformed from a capital intensive, highly cyclical industry to an industry that can generate solid returns on capital and sustained profits.

The long-term outlook for general aviation is promising, as growth at the high-end offsets continuing retirements at the traditional low end of the segment. The active general aviation fleet is forecast to remain relatively stable between 2021 and 2041. While steady growth in both GDP and corporate profits results in continued growth of the turbine and rotorcraft fleets, the largest segment of the fleet – fixed-wing piston aircraft – continues to shrink over the forecast period. **Table 11** details the primary general aviation demand indicators as forecast by the FAA.

TABLE 11 | FAA General Aviation Forecast

Demand Indicator	2021	2041	CAGR
General Aviation (GA) Fleet			
Total Fixed Wing Piston	139,065	116,905	-0.86%
Total Fixed Wing Turbine	25,790	35,780	1.65%
Total Helicopters	10,215	13,390	1.36%
Total Other (experimental, light sport, etc.)	30,800	42,715	1.65%
Total GA Fleet	***205,870***	***208,790***	***0.07%***
General Aviation Operations			
Local	12,743,768	14,392,959	0.61%
Itinerant	13,199,029	15,737,728	0.88%
Total GA Operations	***25,942,797***	***30,130,687***	***0.75%***

CAGR: compound annual growth rate (2021-2041)

Source: FAA Aerospace Forecast - Fiscal Years 2021-2041

In 2021, the FAA estimated there were 139,065 piston-powered, fixed-wing aircraft in the national fleet. The total number of piston-powered aircraft in the fleet is forecast to decline by -0.9 percent from 2021-2041, resulting in 116,905 by 2041. This reflects a decline of -0.9 percent annually for single engine pistons and -0.4 percent for multi-engine pistons.

Total turbine aircraft are forecast to grow at an annual growth rate of 1.7 percent through 2041. The FAA estimates there were 25,790 turbine-powered aircraft in the national fleet in 2021, and there will be 35,780 by 2041. This includes annual growth rates of 0.6 percent for turboprops, 2.3 percent for business jets, and 1.4 percent for turbine helicopters. **Exhibit 15** presents the historical and forecast U.S. active general aviation aircraft.

The FAA also forecasts total operations based upon activity at control towers across the U.S. Operations are categorized as air carrier, air taxi/commuter, general aviation, and military. While the fleet size remains relatively level, the number of general aviation operations at towered airports is projected to increase from 25.9 million in 2021 to 30.1 million in 2041, with an average increase of 0.8 percent per year as growth in turbine, rotorcraft, and experimental hours offset a decline in fixed-wing piston hours. This includes annual growth rates of 0.6 percent for local general aviation operations and 0.9 percent for itinerant general aviation operations.

GENERAL AVIATION AIRCRAFT SHIPMENTS AND REVENUE

The 2007-2009 economic recession had a negative impact on general aviation aircraft production, and the industry was slow to recover. Aircraft manufacturing declined for three straight years from 2008 through 2010. Since this time, aircraft manufacturing has stabilized and returned to growth. According to General Aviation Manufactures Association (GAMA), there is an expected rebound in aircraft demand once the impact of the COVID pandemic has passed and belief that innovations in electric propulsion and supersonic technologies will increase the sector's global reach. Despite the industry's fourth quarter rebound, the pandemic took its toll on 2020 shipments and billings. The least affected segment, piston airplanes (including both single engine and multi-engine aircraft), saw deliveries drop just 0.9 percent year over year to 1,312 units, but turboprop shipments declined 15.6 percent to 443 and business jet deliveries fell 20.4 percent to 644 aircraft. **Table 12** presents currently available historical data related to general aviation aircraft shipments.

Worldwide shipments of general aviation airplanes declined in the year 2020 with a total of 2,399 units delivered around the globe, compared to 2,658 units in 2019, but still surpassed the 2,325 units in 2017. Worldwide general aviation billings were the highest in 2014. In 2020, there was a decline of new aircraft shipments with a total of $20,029 billion compared to the previous year of $23,515 billion. North America continues to be the largest market for general aviation aircraft and leads the way in the manufacturing of piston, turboprop, and jet aircraft. The Asia-Pacific region is the second largest market for piston-powered, while Europe is the second leading in the turboprop and business jets.

TABLE 12 | Annual General Aviation Airplane Shipments Manufactured Worldwide and Factory Net Billings

Year	Total	SEP	MEP	TP	J	Net Billings ($millions)
1994	1,132	544	77	233	278	3,749
1995	1,251	605	61	285	300	4,294
1996	1,437	731	70	320	316	4,936
1997	1,840	1043	80	279	438	7,170
1998	2,457	1508	98	336	515	8,604
1999	2,808	1689	112	340	667	11,560
2000	3,147	1,877	103	415	752	13,496
2001	2,998	1,645	147	422	784	13,868
2002	2,677	1,591	130	280	676	11,778
2003	2,686	1,825	71	272	518	9,998
2004	2,962	1,999	52	319	592	12,093
2005	3,590	2,326	139	375	750	15,156
2006	4,054	2,513	242	412	887	18,815
2007	4,277	2,417	258	465	1,137	21,837
2008	3,974	1,943	176	538	1,317	24,846
2009	2,283	893	70	446	874	19,474
2010	2,024	781	108	368	767	19,715
2011	2,120	761	137	526	696	19,042
2012	2,164	817	91	584	672	18,895
2013	2,353	908	122	645	678	23,450
2014	2,454	986	143	603	722	24,499
2015	2,331	946	110	557	718	24,129
2016	2,268	890	129	582	667	21,092
2017	2,324	936	149	563	676	20,197
2018	2,441	952	185	601	703	20,515
2019	2,658	1,111	213	525	809	23,515
2020	2,399	1,155	157	443	644	20,029
SEP - Single-Engine Piston; MEP - Multi-Engine Piston; TP - Turboprop; J - Turbofan/Turbojet						

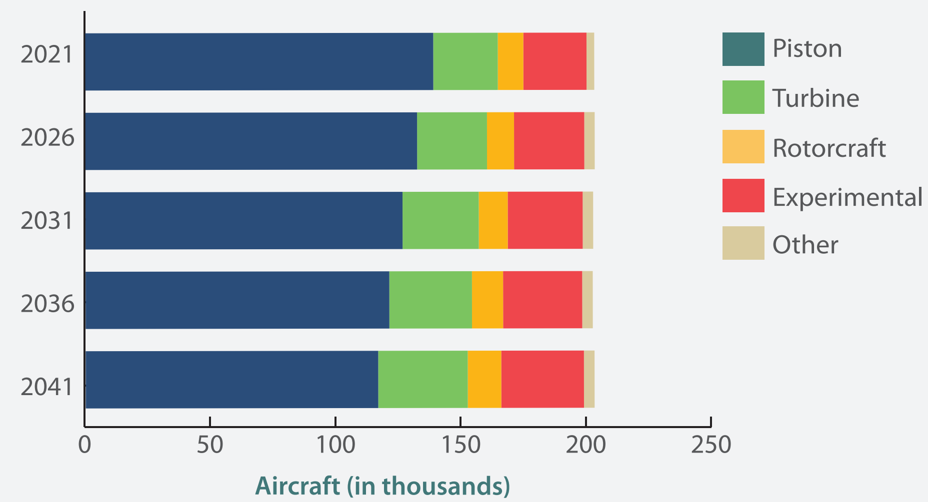
Source: General Aviation Manufacturers Association, 2020 Annual Report

Business Jets: Business jet deliveries decreased from 809 units in 2019 to 644 units in 2020, the second largest drop since the 2008-2009 economic recession. The North American market accounted for 66 percent of business jet deliveries, which is a 1.1 percent decrease in market share compared to 2019.

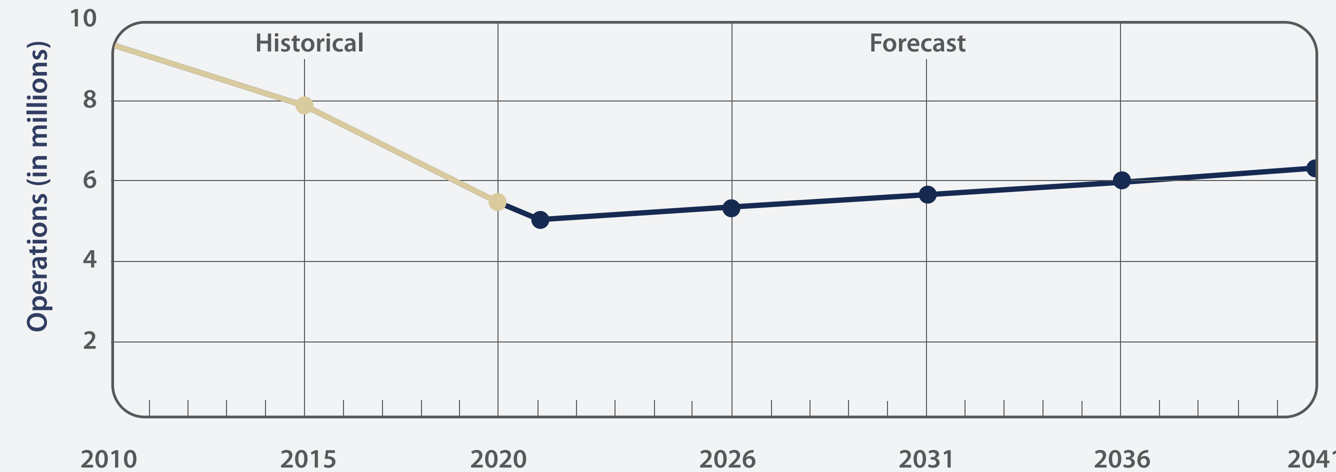
Turboprops: Turboprop shipments were down from 525 in 2019 to 443 in 2020. North America's market share of turboprop aircraft, however, increased by 4.6 percent in the last year. The European market also increased, while Latin America, Middle East Africana, and Asia-Pacific markets decreased their market share.

Pistons: In 2020, piston airplane shipments fell to 1,312 units compared to 1,324 units in the prior year. North America's market share of piston aircraft deliveries dropped 1.5 percent from the year 2019. The Asia-Pacific market experienced a positive rate in market share during the past year, while Europe, Latin-America, and Middle East saw a decline.

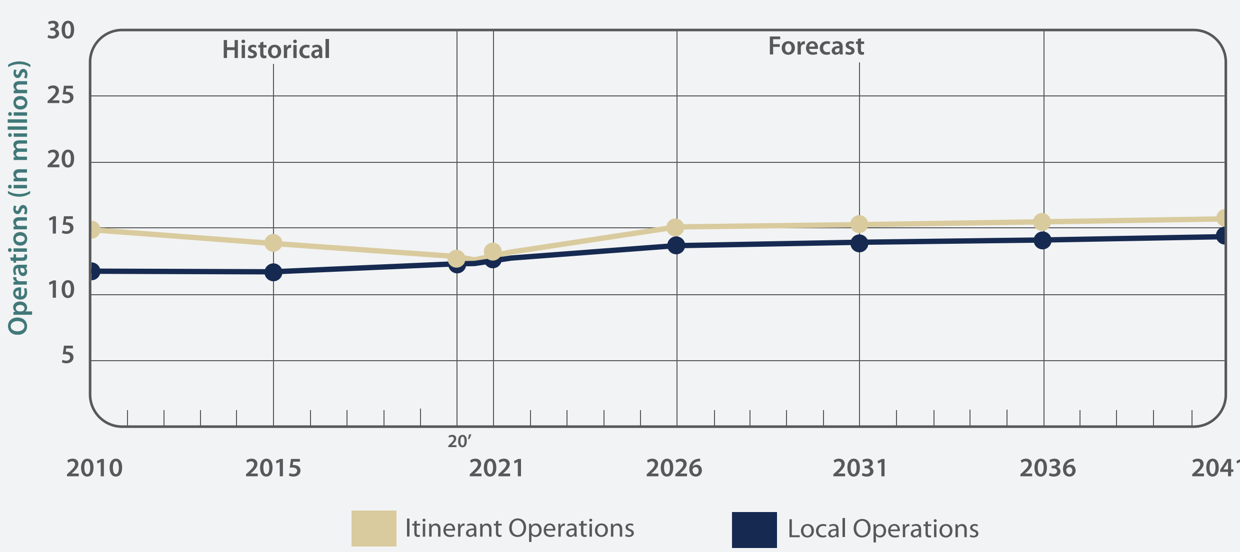
U.S. Active General Aviation Aircraft



U.S. Air Taxi Operations



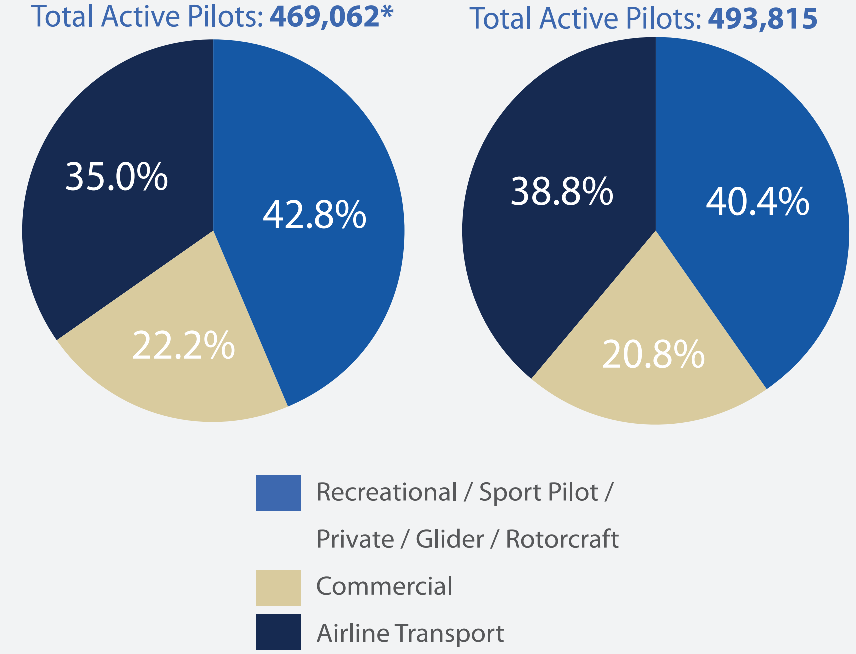
U.S. General Aviation Operations



Active Pilots By Certificate

2020
Total Active Pilots: **469,062***

2041
Total Active Pilots: **493,815**



**Excludes Student Pilot Certificates*

Source: FAA Aerospace Forecasts FY2021-2041

U.S. Pilot Population

As detailed in **Exhibit 15**, there were 469,062 active pilots certificated by the FAA at the end of 2020. All pilot categories, except for private, rotorcraft- and recreational-only certificates, continued to increase. Except for student pilots and airline transport pilots (ATP), the number of active general aviation pilots is projected to decrease about 2,654 (down 0.04 percent annually) between 2020 and 2041. The ATP category is forecast to increase by 27,407 (up 0.7 percent annually). Sport pilots are predicted to increase by 2.7 percent annually over the forecast period, while both private and commercial pilot certificates are projected to decrease at an average annual rate of 0.4 and 0.1 percent, respectively, until 2041. The FAA has currently suspended the student pilot forecast.

RISKS TO THE FORECASTS

While the FAA is confident that its forecasts for aviation demand and activity can be reached, this is dependent on several factors, including the strength of the global economy, security (including the threat of international terrorism), and oil prices. Higher oil prices could lead to further shifts in consumer spending away from aviation, dampening a recovery in air transport demand. The COVID-19 pandemic has also presented a new risk without clear historical precedent. The long-term impact of COVID-19 on the aviation industry will not be understood until the full spread or intensity of the human consequences, as well as the breadth and depth of possible economic fallout, is known.

AIRPORT SERVICE AREA FORECASTS

Before aviation demand can be determined for an airport, it is necessary to first identify the airport's role. As stated in the previous section, ODO is classified in the NPIAS as a National GA airport, meaning its primary role is to offer pilots an attractive alternative to busy primary airports and to serve general aviation needs in the service area. These needs include a diverse range of private general aviation flying activities and include all segments of the aviation industry except commercial air carriers. GA represents the largest component of the national aviation system and includes activities, such as pilot training, recreational flying, and the use of turboprop and jet aircraft for business and corporate use.

ODO was also included in the 2010 *Texas Airport System Plan* (TASP). At a state level, the TASP classifies ODO as a Business/Corporate (BC) facility, which is an airport that provides community access by business jets. The TASP further classifies ODO into a "regional" functional category, meaning it supports higher performance aircraft as compared to other nearby GA facilities.

The next step in defining an airport's demand is to identify its service area. The service area is a generalized geographical area where a potential market for airport services, including based aircraft, exists. Several factors help determine the airport service area, including transportation networks, access to other GA airports, quality of aviation facilities, and distance and travel time between users and facilities.

The service area for a National GA airport like ODO typically extends up to a 30-nm radius around the airport but can stretch beyond this. The proximity and level of GA services are largely the defining factors when describing the GA service area. There are four airports located within 30 nm of ODO, three of which are included in the NPIAS. These are: Midland International Air and Space Port (MAF) located 10 miles east of ODO, Midland Airpark Airport (MDD) located 16 miles east/northeast, and Andrews County Airport (E11) located 26 miles north/northwest. The non-NPIAS airport located within the vicinity of ODO is the privately owned Skywest Inc. Airport located 16 miles east/southeast.

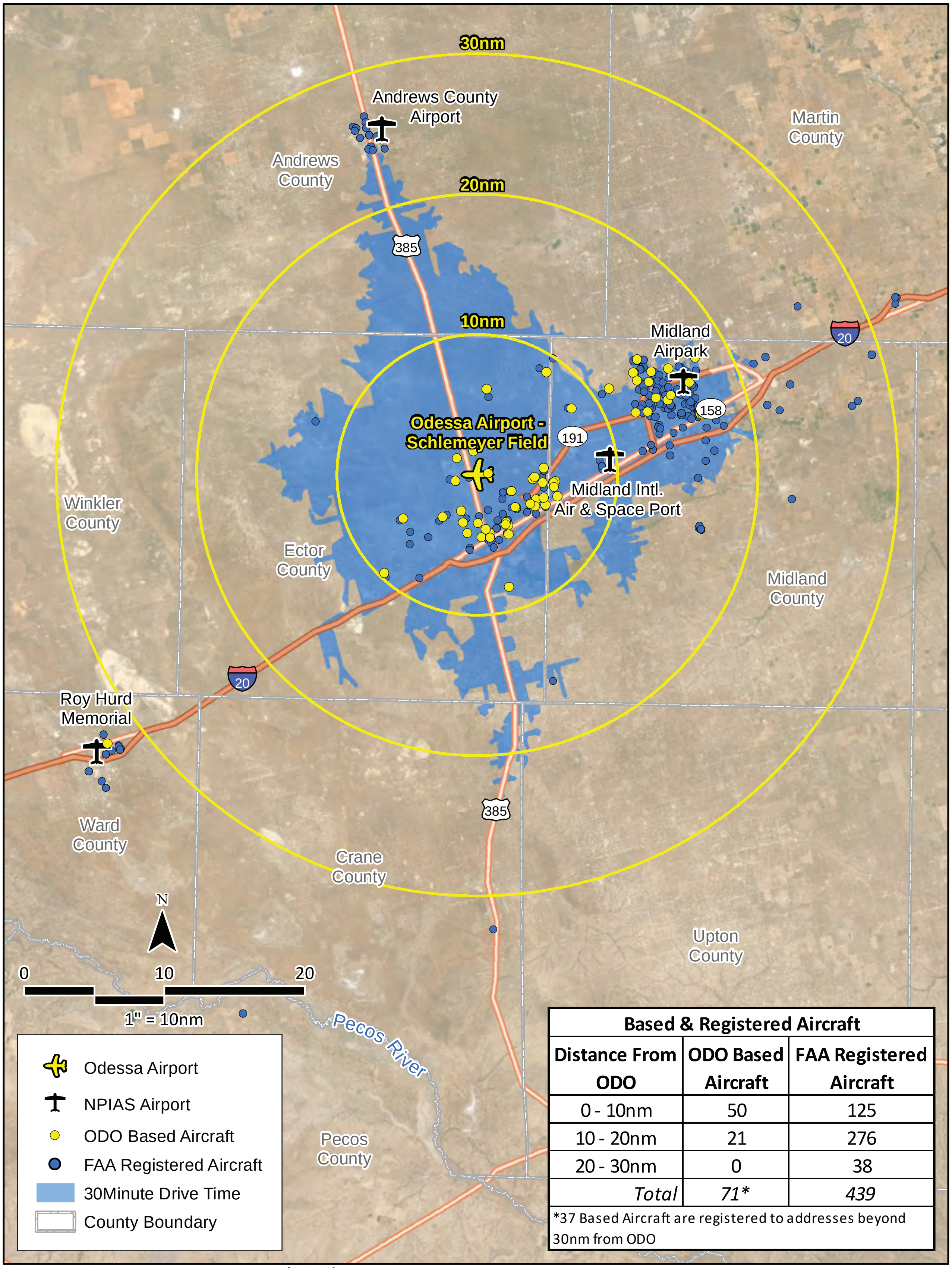
There are two primary demand components that must be addressed in order to define the ODO GA service area. The first is the airport's ability to attract based aircraft. Convenience is generally the determining factor in an aircraft owner's decision to base at a particular airport, with proximity to their residence or business being the key incentive. **Exhibit 16** depicts a 30-minute drive time isochrone from ODO, which encompasses a significant portion of Ector County and extends north into Andrews County and east into Midland County. The exhibit also illustrates based and registered aircraft in the region. As can be seen, there are 71 based aircraft within 30 nm of ODO, with the airport's other based aircraft registered to addresses beyond the 30 nm radius.

The second demand segment to consider is itinerant aircraft operations. In most instances, pilots will choose to utilize airports nearer their intended destination; however, this is also contingent on the airport's capabilities to accommodate the aircraft operator. As a result, airports offering quality services and facilities are more likely to attract itinerant operators in the region.

ODO offers an appealing alternative to pilots in the Midland-Odessa area who want to avoid congestion at MAF, as well as convenient access to Interstate 20. The airport is also highly competitive when compared to other GA facilities in the region, with three runways capable of accommodating business jets, instrument approaches, and a full-service FBO. In addition to ODO's available facilities, the city is the largest in the county and offers a number of hotels and restaurants for visitors. Therefore, the airport's primary service area is defined as the Odessa MSA, which is comprised of Ector County.

REGISTERED AIRCRAFT FORECAST

Historical registered aircraft counts for Ector County from 2002 to 2022 are presented in **Table 13**. Aircraft registrations have fluctuated from a low of 98 aircraft to a peak of 198. Over the last 20 years, registrations in the county have declined from 186 registrations in 2002 to 98 in 2021. The declining trend is likely, at least partly, a result of the FAA's changed aircraft registration requirements that were issued in 2010. The FAA terminated the registration of all aircraft registered before October 1, 2010, over a three-year period, and required re-registration to retain U.S. civil aircraft status. As a result, previously registered aircraft that may have been sold, scrapped/destroyed, or registered to multiple addresses were dropped from the database.



Based & Registered Aircraft

Distance From ODO	ODO Based Aircraft	FAA Registered Aircraft
0 - 10nm	50	125
10 - 20nm	21	276
20 - 30nm	0	38
Total	*71**	*439*

*37 Based Aircraft are registered to addresses beyond 30nm from ODO

Source: ESRI Basemap Imagery (2019), FAA Registered Aircraft Database

TABLE 13 | Ector County, TX Registered Aircraft

Year	Single Engine Piston	Multi-Engine Piston	Turboprop	Jet	Helicopter	UAV	Other	Total
2002	141	9	9	2	2	0	23	186
2003	129	5	14	2	1	0	22	173
2004	131	7	13	2	1	0	21	175
2005	131	7	17	1	1	0	20	177
2006	141	12	4	0	2	0	19	178
2007	151	13	7	1	3	0	17	192
2008	150	15	10	2	3	0	17	197
2009	146	18	10	1	2	0	15	192
2010	149	17	9	2	3	0	15	195
2011	148	17	10	3	4	0	16	198
2012	137	18	15	2	5	0	12	189
2013	117	18	13	3	4	0	7	162
2014	123	15	15	5	3	0	6	167
2015	120	13	10	5	2	1	4	155
2016	113	12	11	5	3	1	2	147
2017	106	12	9	4	2	1	1	135
2018	88	12	9	5	2	0	1	117
2019	76	11	8	8	3	0	1	107
2020	71	12	7	8	4	0	2	104
2021	71	8	6	6	4	0	3	98
2022*	74	8	6	6	3	0	2	99

UAV – Unmanned Aerial Vehicle
*Fleet mix reported through 05/11/2022

Source: FAA Registered Aircraft

As detailed in the table, most of the aircraft registered in Ector County are single engine piston aircraft, with 74 of the 99 registered aircraft falling into this category and accounting for 75 percent of the fleet mix. The next largest category is multi-engine piston aircraft, which comprise eight percent of the county's registered aircraft, followed by turboprops and jets at six percent each.

New registered aircraft forecasts have been prepared for Ector County, which will ultimately be used to determine projections for based aircraft at ODO over the next 20 years. Several regression forecasts were considered as well, including single- and multi-variable regressions examining registered aircraft's correlation with the service area population, employment, income, and gross regional product, and with U.S. active general aviation aircraft. None of the regressions produced a strong correlation (r^2 value over 0.9); therefore, the regression forecasts were not considered further.

Table 14 details several projections of registered aircraft for the service area, with a goal of presenting a planning envelope that shows a range of projections based on historic trends. The first set of forecasts is based on market share, which considers the relationship between registered aircraft located in Ector County and active aircraft within the United States. The next set of projections is based on a ratio of the number of aircraft per 1,000 county residents. **Exhibit 17** graphically depicts each of the projections.

TABLE 14 | Registered Aircraft Forecast - Ector County, TX

Year	Service Area Registrations[1]	U.S. Active Aircraft[2]	Market Share of U.S. Aircraft	Service Area Population[3]	Aircraft per 1,000 Residents
2002	186	211,244	0.0880%	122,199	1.52
2003	173	209,606	0.0825%	122,739	1.41
2004	175	219,319	0.0798%	124,163	1.41
2005	177	224,257	0.0789%	125,378	1.41
2006	178	221,942	0.0802%	127,476	1.40
2007	192	231,606	0.0829%	130,459	1.47
2008	197	228,664	0.0862%	133,064	1.48
2009	192	223,876	0.0858%	136,930	1.40
2010	195	223,370	0.0873%	137,075	1.42
2011	198	220,453	0.0898%	139,642	1.42
2012	189	209,034	0.0904%	144,495	1.31
2013	162	199,927	0.0810%	149,656	1.08
2014	167	204,408	0.0817%	154,588	1.08
2015	155	210,031	0.0738%	159,903	0.97
2016	147	211,794	0.0694%	157,858	0.93
2017	135	211,757	0.0638%	156,951	0.86
2018	117	211,749	0.0553%	161,960	0.72
2019	107	210,981	0.0507%	166,223	0.64
2020	104	204,980	0.0507%	167,765	0.62
2021	98	205,870	0.0476%	169,665	0.58
2022	99	206,590	0.0479%	171,601	0.58
Constant Market Share of U.S. Active Aircraft - Low Range (CAGR 0.11%)					
2027	99	207,030	0.0479%	181,240	0.55
2032	99	207,140	0.0479%	190,847	0.52
2042	100	208,911	0.0479%	209,421	0.48
Increasing Market Share of U.S. Active Aircraft - Return to Historic High (CAGR 3.34%)					
2027	121	207,030	0.0583%	181,240	0.67
2032	143	207,140	0.0690%	190,847	0.75
2042	189	208,937	0.0904%	209,421	0.90
INCREASING MARKET SHARE OF U.S. ACTIVE AIRCRAFT - MID RANGE (CAGR 1.96%) - SELECTED FORECAST					
2027	110	207,030	0.0530%	181,240	0.61
2032	121	207,140	0.0584%	190,847	0.63
2042	145	208,937	0.0692%	209,421	0.69
Constant Ratio Projection per 1,000 County Residents - Low Range (CAGR 1.06%)					
2027	105	207,030	0.0505%	181,240	0.58
2032	110	207,140	0.0532%	190,847	0.58
2042	121	208,937	0.0579%	209,421	0.58
Increasing Ratio Projection per 1,000 County Residents - 10-Year Average (CAGR 2.76%)					
2027	115	207,030	0.0555%	181,240	0.63
2032	132	207,140	0.0637%	190,847	0.69
2042	169	208,937	0.0808%	209,421	0.81
CAGR: Compound Annual Growth Rate					

Source: FAA Aircraft Registration Database; FAA Aerospace Forecasts- Fiscal Years 2021-2041; Woods and Poole (2021).

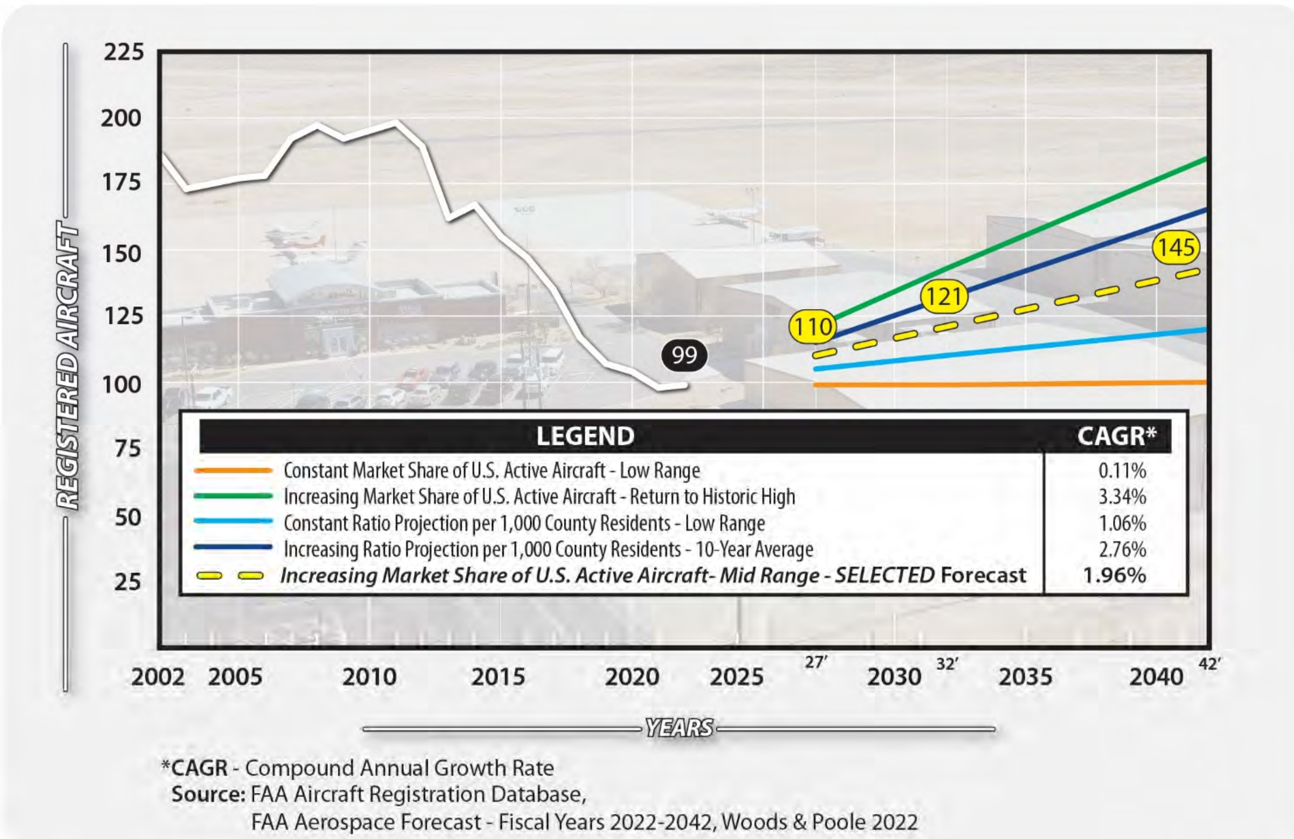


Exhibit 17 – Ector County Registered Aircraft Projections

Market Share Projections

- ***Constant Market Share*** – The low range market share forecast maintains the 2022 market share of county residents (0.0479%) at a constant throughout the planning period. The result is virtually no growth in registrations over the 20-year planning period, with 100 aircraft registrations in the county by 2042, reflective of a 0.11 percent compound annual growth rate (CAGR).

- ***Increasing Market Share*** – Two increasing market share forecasts were also considered. The first evaluated a scenario based on the county's historic high market share, which was 0.0904 percent in 2012. A return to this produces much more growth, with 189 aircraft projected by the end of the planning period (3.34 percent CAGR). A mid-range market share forecast was also considered, with a less aggressive growth rate of 1.96 percent, which produced a forecast of 145 registered aircraft in the county by 2042.

Ratio Projections

- ***Constant Ratio*** – In 2022, there were 0.58 registered aircraft per 1,000 county residents. Carrying this ratio forward through the plan years results in a CAGR of 1.06 percent, or 121 aircraft by 2042.

- ***Increasing Ratio*** – Over the last 10 years, the county's registered aircraft to population ratio has fluctuated between 0.58 and 1.08, or an average of 0.81 aircraft per 1,000 people. Applying this average to the planning period results in a more aggressive growth scenario, with 169 registered aircraft by 2042. This equates to a CAGR of 2.76 percent.

Selected Forecast

The registered aircraft projections result in a range between 100 and 189 registered aircraft in Ector County by 2042, with the constant market share representing the low end and the increasing market share – return to historic high representing the high end of the range. Each of the forecasts has been evaluated for reasonableness. Both the constant market share and constant ratio forecasts show very slow growth in county-registered aircraft, and both are deemed unlikely based on the county's historic levels of registered aircraft. The historic high market share and 10-year average ratio projections resulted in much more aggressive growth, but both likely overstate the growth potential in county-registered aircraft. Therefore, the most reasonable forecast is the mid-range increasing market share projection, and this projection will be carried forward as the selected forecast for service area registered aircraft. It shows an increase from 99 registered aircraft in 2022 to 110 in 2027, 121 in 2032, and 145 in 2042, reflective of a 1.96 percent CAGR.

BASED AIRCRAFT FORECAST

Nationally, based aircraft records have been historically inconsistent. Airports were not required to report their based aircraft totals to the FAA until recently, and any data that was provided was not validated. Now, however, based aircraft counts are included on a registry that the FAA updates and maintains with validated information. According to the FAA's database, ODO has 88 based aircraft, a count which was last validated on May 20, 2021. However, records maintained and confirmed by FBO staff show 108 based aircraft at the airport as of April 2022, which will serve as the base year count for forecasting purposes.

Like the registered aircraft forecasts, two types of projections have been made for based aircraft at ODO – market share and ratio projections. The market share is based on the airport's percentage of based aircraft as compared to registered aircraft in the service area, while the ratio projection is based on the number of based aircraft per 1,000 county residents. The FAA TAF forecast is also included for comparison purposes. An additional forecast based on the TAF growth rate has also been included. The results of these analyses are detailed in **Table 15** and depicted graphically in **Exhibit 18**.

TABLE 15 | Based Aircraft Forecasts

Year	ODO Based Aircraft	Ector County Registrations	Market Share	Ector County Population	Aircraft Per 1,000 Residents
2022	108	98	110.2%	171,601	0.63
Constant Market Share – Low Range (CAGR 1.96%)					
2027	121	110	110.2%	181,240	0.67
2032	133	121	110.2%	190,847	0.70
2042	159	145	110.2%	209,421	0.76
Increasing Market Share (CAGR 2.40%)					
2027	124	110	112.7%	181,240	0.68
2032	139	121	115.1%	190,847	0.73
2042	173	145	120.0%	209,421	0.83
Decreasing Market Share (CAGR 0.93%)					
2027	115	110	105.2%	181,240	0.64
2032	121	121	100.1%	190,847	0.63
2042	130	145	90.0%	209,421	0.62
Constant Ratio per 1,000 Residents (CAGR 1.00%)					
2027	114	110	104.0%	181,240	0.63
2032	120	121	99.3%	190,847	0.63
2042	132	145	91.2%	209,421	0.63
Increasing Ratio per 1,000 Residents (CAGR 1.89%)					
2027	120	110	108.9%	181,240	0.66
2032	132	121	108.8%	190,847	0.69
2042	157	145	108.7%	209,421	0.75
FAA TAF (CAGR 1.46%)					
2027	137	110	124.9%	181,240	0.76
2032	147	121	121.5%	190,847	0.77
2042	167	145	115.6%	209,421	0.80
FAA TAF GROWTH RATE (CAGR 1.46%) – SELECTED FORECAST					
2027	116	110	105.6%	181,240	0.64
2032	125	121	103.2%	190,847	0.65
2042	144	145	99.5%	209,421	0.69

Sources: Airport records; FAA TAF; Woods & Poole CEDDS 2021

Market Share Projections

- ***Constant Market Share*** – In 2022, the airport had 108 based aircraft, which equates to 110.2 percent of the market share of registered aircraft in Ector County. Carrying this percentage throughout the plan years results in a steady increase in based aircraft, with 159 based aircraft projected by the end of the planning period and equating to a 1.96 percent CAGR.

- ***Increasing Market Share*** – An increasing market share forecast was also evaluated and considered a scenario where ODO held 120.0 percent market share of the service area. This resulted in a more dramatic increase in based aircraft to 173, or 2.40 percent CAGR, by the end of the planning period.

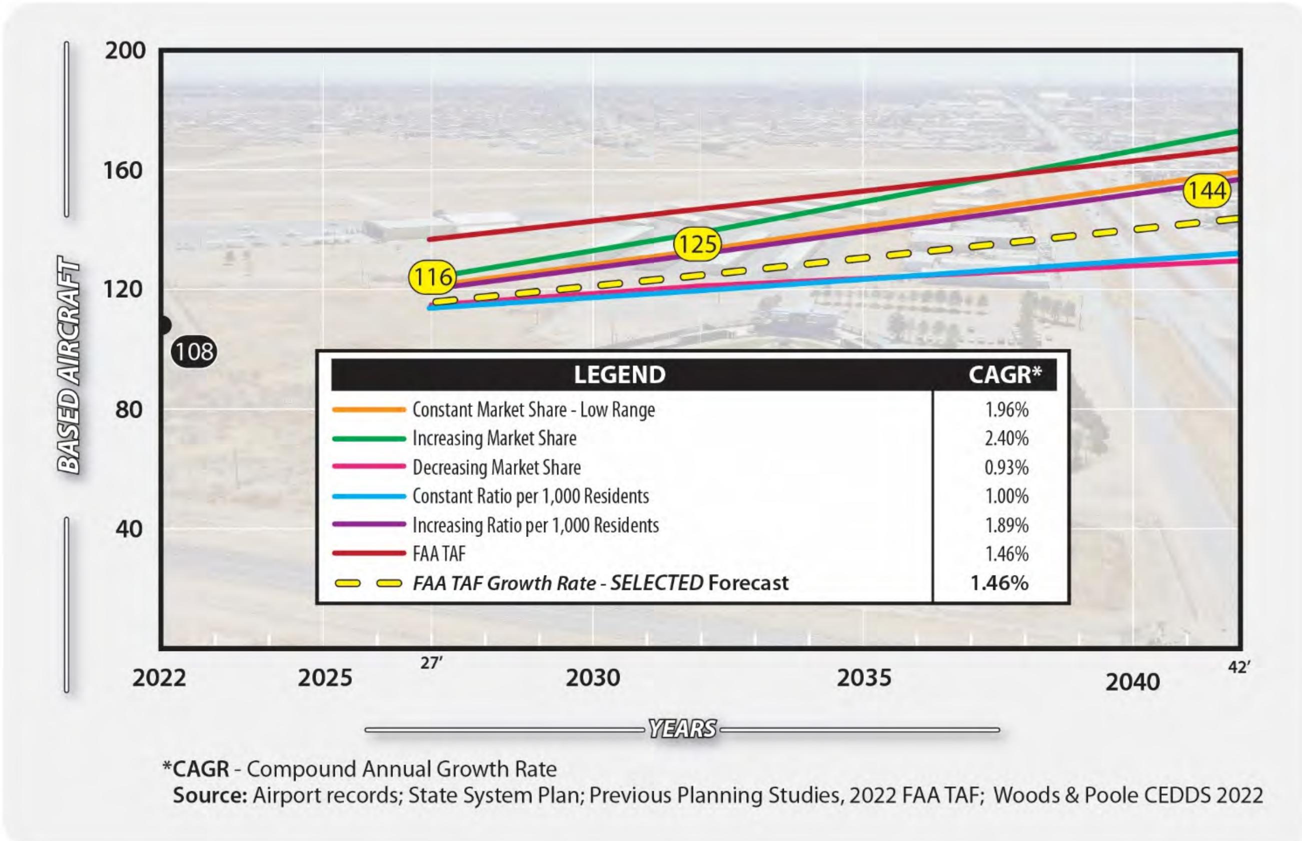


Exhibit 18 – Based Aircraft Projections

- ***Decreasing Market Share*** – While ODO currently holds greater than 100 percent of the market share, it is not unreasonable to consider a scenario in which that number drops. A decreasing market share forecast was evaluated, based on a gradual decrease to 90.0 percent market share. With an increase in countywide registrations anticipated, a decrease in market share still results in growth, albeit slower, with 130 based aircraft forecast by 2042.

Ratio Projections

- ***Constant Ratio*** – In 2022, the ratio of based aircraft per 1,000 county residents stood at 0.63. Maintaining this at a constant through 2042 resulted in a growth rate of 1.00 percent, or 132 based aircraft.

- ***Increasing Ratio*** – An increasing ratio scenario was also evaluated that considered a ratio of 0.75 based aircraft per 1,000 residents in 2042. Applying this figure to the end of the planning period results in 157 based aircraft at the airport by 2042, at a CAGR of 1.89 percent.

TAF Projection

- ***TAF*** – As a point of comparison, the FAA TAF projections for based aircraft at ODO have also been included. The TAF shows growth in based aircraft at a rate of 1.46 percent, with 167 based aircraft projected by the end of the planning period.

- **TAF Growth Rate** – As stated, the TAF projection resulted in a CAGR of 1.46 percent. An additional forecast was prepared that applied this growth rate to the existing based aircraft count of 108, which resulted in 144 based aircraft by 2042.

Selected Forecast

The forecasts produced a planning envelope ranging from 130 to 173 based aircraft at the airport by 2042. Discussions with airport personnel indicate that at least one tenant who currently maintains multiple aircraft at ODO has immediate plans to add more aircraft. This, combined with the anticipated increase in population and county registered aircraft, justifies a growth scenario with steady increases in based aircraft. Therefore, the TAF growth rate forecast has been selected as the preferred projection. With a CAGR of 1.46 percent, this forecast shows an increase of 36 based aircraft by the end of the planning period, for a total of 144 aircraft based at ODO by 2042.

Based Aircraft Fleet Mix

The type of aircraft based at an airport is another important consideration when planning for the future. Currently, the fleet mix at ODO consists of 86 single engine piston aircraft, seven multi-engine, six turboprops, eight jets, and one aircraft classified as 'other.' Given that the total number of based aircraft at the airport is projected to increase over the planning period, it is necessary to project how the fleet mix will change over this time. A forecast of the evolving fleet mix will ensure that adequate facilities are planned to accommodate these aircraft in the future.

The fleet mix projection for ODO was determined by comparing the airport's existing fleet mix to national general aviation fleet mix trends. The forecast for the active U.S. GA fleet shows increasing trends in turbine and jet aircraft, with piston aircraft declining over the next 20 years. Multi-engine piston aircraft are anticipated to ultimately be phased out altogether. Growth is expected in experimental and light sport aircraft as well. The GAMA has high optimism that innovations in electric propulsion and supersonic technologies will increase in the sector's global reach, which will result in the growth of experimental and light sport aircraft.

Table 16 details the fleet mix projection prepared for ODO. While these forecasts take into account national trends, the fleet mix at ODO is anticipated to continue to consist primarily of piston aircraft over the planning period, with the addition of more turboprops, jets, and helicopters over the next 20 years.

TABLE 16 | Based Aircraft Fleet Mix

	EXISTING		FORECAST					
Aircraft Type	**2022**	**%**	**2027**	**%**	**2032**	**%**	**2042**	**%**
Single Engine Piston	86	80%	92	79%	99	79%	109	76%
Multi-Engine Piston	7	6%	5	4%	3	2%	1	1%
Turboprop	6	6%	8	7%	9	7%	12	8%
Jet	8	7%	9	8%	11	9%	15	10%
Helicopter	0	0%	1	1%	2	2%	4	3%
Other	1	1%	1	1%	1	1%	3	2%
Totals	**108**	**100%**	**116**	**100%**	**125**	**100%**	**144**	**100%**

Source: Airport records; Coffman Associates analysis

GENERAL AVIATION OPERATIONS

General aviation operations are classified as either local or itinerant. A local operation is a takeoff or landing performed by an aircraft that operates within sight of the airport, or which executes simulated approaches or touch-and-go operations at the airport. Generally, local operations are characterized by training operations or operations that remain in local airspace that originate and conclude at the same airport. Itinerant operations are those performed by aircraft with a specific origin or destination away from the airport. Typically, itinerant operations increase with business and commercial use, since business aircraft are not generally used for large scale training activities.

As a non-towered airport, operational estimates for ODO are derived from several sources, including the FAA TAF and the FAA Form 5010, *Airport Master Record*. The TAF reflects 79,460 total operations in 2022, while the *Airport Master Record* shows 78,000 total operations. The total recorded in the *Airport Master Record* has been selected for use as the base year operational count from which itinerant and local GA operational forecasts will be developed.

Itinerant GA Operations Forecast

The *Airport Master Record* reports 26,000 itinerant operations, which accounts for approximately 33 percent of the airport's total activity. Several forecasts for itinerant GA operations have been prepared, as presented in **Table 17** and on **Exhibit 19**. Like the previous projections, market share and ratio comparisons have been made. For the market share evaluations, ODO's annual itinerant operations have been compared to total U.S. itinerant general aviation operations. The ratio projections are based on total operations per based aircraft, or OPBA. The FAA TAF forecast for itinerant operations has also been included for comparison purposes.

TABLE 17 | General Aviation Itinerant Operations

Year	ODO Itinerant Operations	U.S. ATCT GA Itinerant Operations	ODO Share %	ODO Based Aircraft	OPBA
2022	26,000	14,060,610	0.1849%	108	241
Constant Market Share (CAGR 0.62%)					
2027	28,100	15,177,147	0.1849%	116	242
2032	28,400	15,372,725	0.1849%	125	228
2042	29,400	15,876,766	0.1849%	144	204
INCREASING MARKET SHARE – MID RANGE (CAGR 1.60%) – SELECTED FORECAST					
2027	29,600	15,177,147	0.1949%	116	255
2032	31,500	15,372,725	0.2050%	125	252
2042	35,700	15,876,766	0.2250%	144	247
Increasing Market Share – High Range (CAGR 3.07%)					
2027	32,400	15,177,147	0.2137%	116	279
2032	37,300	15,372,725	0.2425%	125	299
2042	47,600	15,876,766	0.3000%	144	330
Constant OPBA Ratio (CAGR 1.45%)					
2027	28,000	15,177,147	0.1845%	116	241
2032	30,100	15,372,725	0.1958%	125	241
2042	34,700	15,876,766	0.2186%	144	241
FAA TAF Forecast (CAGR 1.01%)					
2027	27,741	15,177,147	0.1828%	116	239
2032	29,039	15,372,725	0.1889%	125	233
2042	31,807	15,876,766	0.2003%	144	220

Sources: FAA Airport Master Record 5010; FAA Aerospace Forecast 2021-2041; FAA TAF

Market Share Projections

In 2022, with 26,000 itinerant operations, the airport held 0.1849 percent of the market share of national itinerant GA operations. The first forecast carries this market share forward as a constant through the planning period, resulting in 29,400 operations by 2042 and a CAGR of 0.62 percent. Two increasing market share forecasts were also evaluated. The first of these considered an increase to 0.2250 percent of the market share by 2042, which resulted in 35,700 itinerant operations by the end of the planning period and represents the mid-range market share projection. A more aggressive growth scenario was also evaluated, based on an increase to 0.3000 percent market share. This produced a CAGR of 3.07 percent, or 47,600 itinerant GA operations by the end of the planning period.

Operations Per Based Aircraft Projection

Another forecasting methodology utilized considers the number of itinerant operations occurring at ODO compared to the number of based aircraft at the airport. In 2022, there were 241 itinerant operations per based aircraft. When this figure is carried through the planning period, the result is a 1.45 percent increase in itinerant GA operations, with 34,700 itinerant operations by 2042.

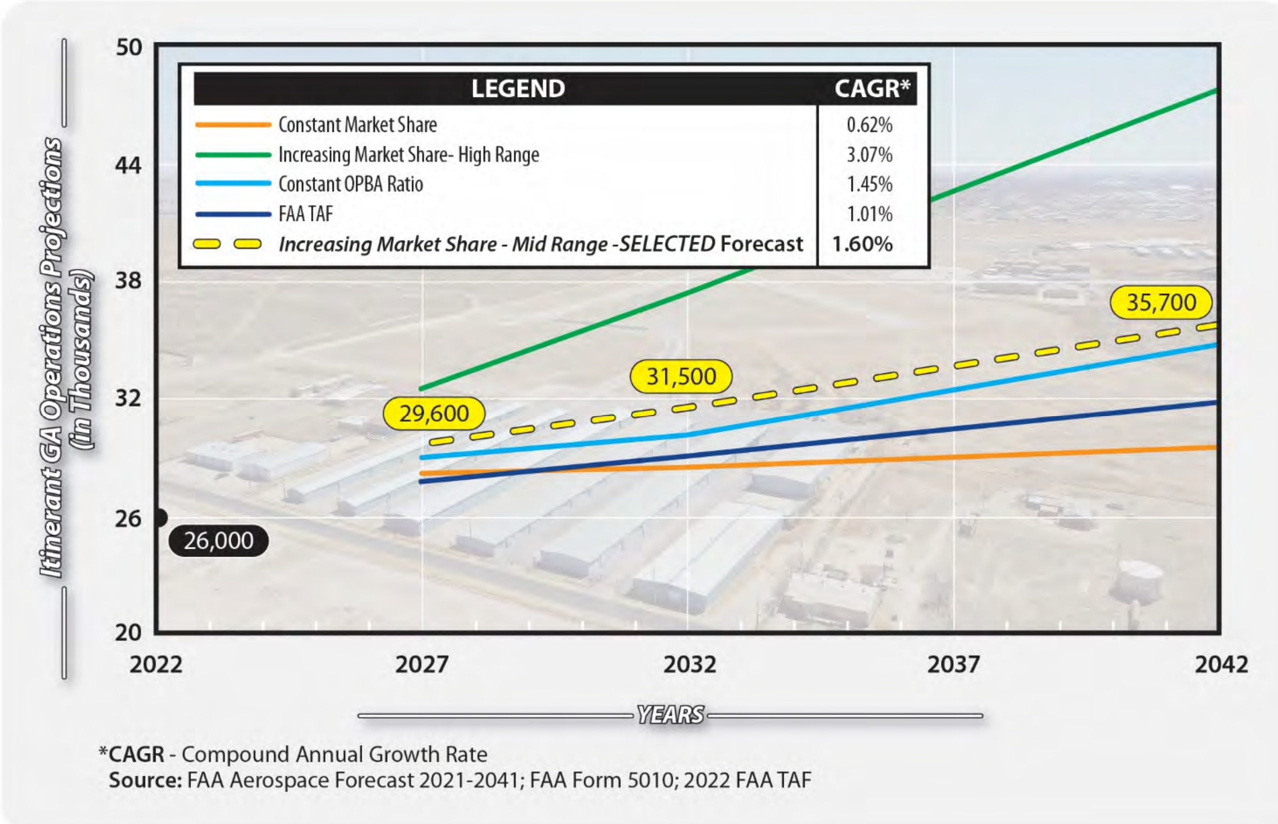


Exhibit 19 – Itinerant GA Operations Projections

Selected Forecast

Including the TAF projections, the forecasts prepared resulted in a range between 29,400 and 47,600 annual itinerant GA operations at ODO. The mid-range increasing market share forecast, reflective of a 1.60 percent CAGR, has been selected as the most reasonable projection. While this growth rate is slightly higher than what is predicted in both the TAF and nationally for itinerant operations over the next 20 years, this projection is justified by the current level of itinerant activity at the airport, as well as what is occurring around the region. Odessa is one of the fastest growing cities in Texas, with significant contributions to the state's economy from the energy sector. It is reasonable to assume that itinerant GA operations will increase pursuant with population and industrial/economic growth in West Texas. Additionally, it is not unreasonable to assume some level of itinerant activity from flights bound for MAF that elect to utilize ODO instead.

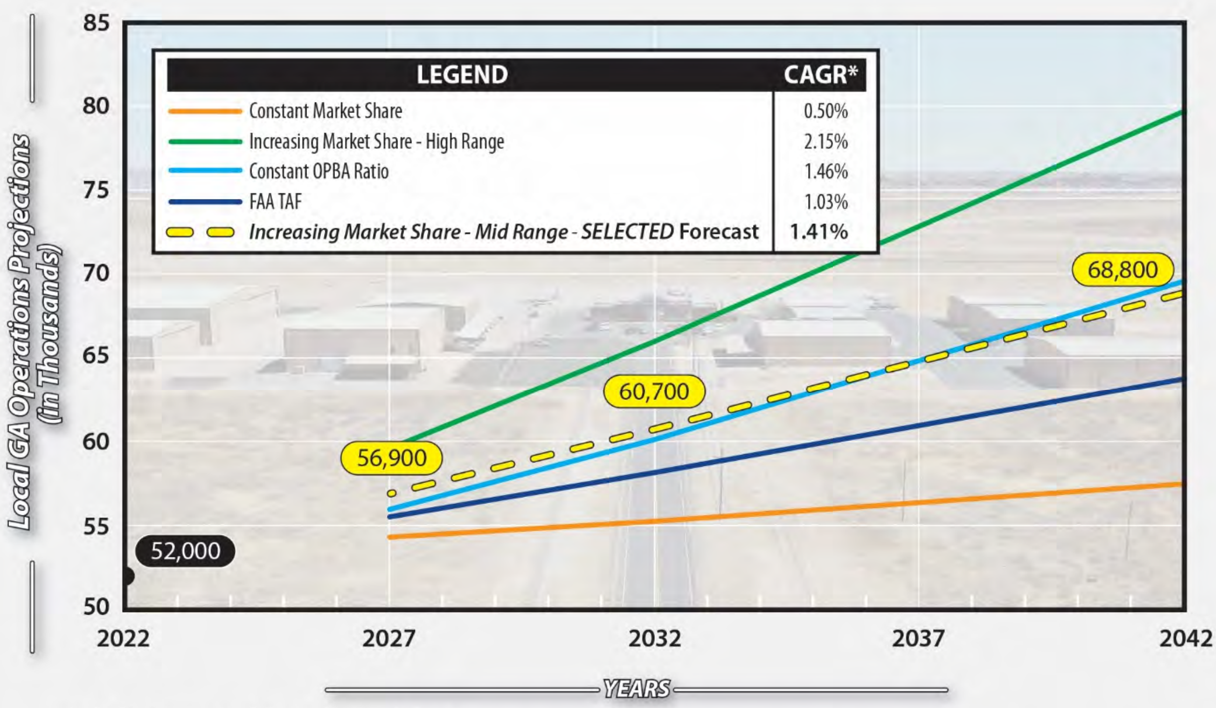
Local GA Operations Forecast

Like the forecasts prepared for itinerant GA operations, projections for local GA operations have been made. These forecasts are detailed in **Table 18** and on **Exhibit 20**. Local GA operations account for approximately 67 percent of total operations. As mentioned previously, a local operation is one that stays within the airport's traffic pattern, such as training operations or touch-and-goes. In 2022, there were an estimated 52,000 local GA operations at the airport, which translated to a market share of 0.3966 percent and 481 operations per based aircraft.

TABLE 18 | General Aviation Local Operations

Year	ODO Local Operations	U.S. ATCT GA Local Operations	ODO Share %	ODO Based Aircraft	Local Ops per Based Aircraft
2022	52,000	13,111,431	0.3966%	108	481
Constant Market Share (CAGR 0.50%)					
2027	54,300	13,679,977	0.3966%	116	468
2032	55,200	13,927,030	0.3966%	125	442
2042	57,400	14,480,805	0.3966%	144	398
INCREASING MARKET SHARE – MID RANGE (1.41%) – SELECTED FORECAST					
2027	56,900	13,679,977	0.4162%	116	490
2032	60,700	13,927,030	0.4358%	125	486
2042	68,800	14,480,805	0.4750%	144	477
Increasing Market Share – High Range (CAGR 2.15%)					
2027	59,500	13,679,977	0.4350%	116	512
2032	65,900	13,927,030	0.4733%	125	528
2042	79,600	14,480,805	0.5500%	144	552
Constant OPBA Ratio (CAGR 1.46%)					
2027	55,900	13,679,977	0.4086%	116	481
2032	60,100	13,927,030	0.4315%	125	481
2042	69,500	14,480,805	0.4799%	144	481
FAA TAF Forecast (CAGR 1.03%)					
2027	55,484	13,679,977	0.4056%	116	478
2032	58,124	13,927,030	0.4173%	125	466
2042	63,770	14,480,805	0.4404%	144	442

Sources: FAA Aerospace Forecast 2021-2041; FAA TAF



*CAGR - Compound Annual Growth Rate
Source: FAA Aerospace Forecast 2022-2042; FAA Form 5010; State System Plan; Previous Planning Studies; 2022 FAA TAF

Exhibit 20 – Local GA Operations Projections

Market Share Projections

In the first forecast, the constant market share of 0.3966 percent was carried through the plan years. This resulted in 57,400 operations by 2042, for a CAGR of 0.50 percent, which represents the low range of the projections. The next two forecasts evaluated increasing market share scenarios, with the mid-range projection considering an increase to 0.4750 percent of the market share. This resulted in a 1.41 percent CAGR, or 68,800 local operations by 2042. A second increasing market share forecast considered a more aggressive growth scenario, with the airport holding 0.5500 percent of the market share. This produced a total of 79,600 local operations by the end of the planning period, reflective of a 2.15 percent CAGR.

Operations Per Based Aircraft Projection

With 108 based aircraft in 2022, the OPBA for local operations stands at 481. Maintaining this figure as a constant through the next 20 years results in a CAGR of 1.46 percent, which equates to 69,500 local GA operations by 2042.

Selected Forecast

The FAA TAF estimates local operations to reach 63,770 by 2042. The planning envelope that results from the forecasts above ranges from 57,400 to 79,600 local operations by the end of the planning period. Like the itinerant forecasts, the most reasonable forecast lies between the two extremes. In this case, the mid-range increasing market share is the selected projection, resulting in 68,800 local GA operations by 2042—an increase of nearly 17,000 local operations over the next 20 years. Nationally, local GA operations are anticipated to grow at about 0.50 percent. While the selected forecast predicts a stronger growth rate for ODO, the projection is reasonable due to local and regional trends in this type of operation, particularly for airports that support flight training operations, such as ODO.

AIR TAXI OPERATIONS FORECAST

The air taxi category can be classified as a subset of the itinerant operations category and includes aircraft involved in on-demand passenger charter, fractional ownership aircraft operations, small parcel transport, and air ambulance activity. While not typically a significant percentage of total airport operations, air taxi operations can be conducted via more sophisticated aircraft, ranging from multi-engine piston aircraft up to large business jet aircraft. As a result, it is important to factor these types of operations at airports that experience substantial amounts of air taxi operations.

Neither the FAA TAF nor the Form 5010 *Airport Master Record* report any air taxi operations at ODO. However, according to AirportIQ, a data center that collects detailed aviation activity at nontowered airports, ODO does experience air taxi operations. While the 2022 dataset is incomplete, a total number of air taxi operations for the base year was extrapolated and resulted in 664 air taxi operations. The FAA national air taxi forecast projects a 1.1 percent CAGR increase in air taxi operations between 2021 and 2041. The primary reasons for this increase are the technological advancements of the electric vertical take-off and landing aircraft (eVTOL) and the continued national growth in the business jet segment of the air taxi category. The facilities and FBO services available at ODO are accommodating to operators of business jets. Therefore, it is reasonable to expect the business jet component of air taxi activity to increase moderately over time at ODO.

Like the previous operations forecasts, several market share projections were developed that considered different growth scenarios. With 664 annual air taxi operations in 2022, ODO held 0.0132 percent of total national air taxi operations. Carrying this percentage forward throughout the planning period resulted in a CAGR of 1.18 percent, or 840 air taxi operations by 2041. Two increasing market share forecasts were calculated based on mid- and high range scenarios. The mid-range growth scenario produced a projection of 1,240 air taxi operations by 2042, at a CAGR of 3.17 percent. The high range scenario considered a more aggressive growth rate of 4.46 percent, which resulted in 1,590 annual air taxi operations at ODO by the end of the planning period.

A fourth projection was developed based on the 20-year growth rate in air taxi operations that has been forecast by the FAA. Between 2022 and 2042, this type of activity is anticipated to grow at a CAGR of 1.18 percent. Applying this growth rate to the base year air taxi operations at ODO results in an increase to 840 operations by the end of the planning period.

Table 19 details each of the forecasts completed for air taxi operations throughout the long-term planning horizon. Some level of growth in annual air taxi operations is anticipated at ODO over the next 20 years, in line with national trends and local/regional economic activity. As such, the mid-range market share projection has been selected as the most reasonable forecast for air taxi operational growth at ODO. At a CAGR of 3.17 percent, this forecast shows steady growth over the planning period, with 1,240 air taxi operations projected by 2042.

Table 19 | Other Air Taxi Operations

Year	ODO Air Taxi Operations	U.S. Air Taxi Operations	ODO Market Share
2022	664	5,014,824	0.0132%
Constant Market Share (CAGR 1.18%)			
2027	670	5,041,488	0.0132%
2032	760	5,707,729	0.0132%
2042	840	6,358,549	0.0132%
INCREASING MARKET SHARE – MID-RANGE (CAGR 3.17%) - SELECTED FORECAST			
2027	750	5,041,488	0.0143%
2032	930	5,707,729	0.0154%
2042	1,240	6,358,549	0.0175%
Increasing Market Share - High Range (CAGR 4.46%)			
2027	820	5,041,488	0.0162%
2032	1,090	5,707,729	0.0191%
2042	1,590	6,358,549	0.0250%
U.S. 20-Year Forecast Growth Rate (CAGR 1.18%)			
2027	700	5,041,488	0.0139%
2032	750	5,707,729	0.0131%
2042	840	6,358,549	0.0132%

Sources: FAA Form 5010; FAA Aerospace Forecast 2021-2041

MILITARY OPERATIONS FORECAST

It is not uncommon for military aircraft to utilize civilian airports for training or other purposes. However, forecasting military operations is challenging due to their national security nature and the fact that missions can change daily, making it difficult to project future operations based on historical data. Thus, it is not unusual for the FAA to flatline military operations projections. In the case of ODO, the FAA does not reflect any military activity at the airport, as reflected in the 2022 TAF, nor is any projected in the future. For this study, military operations at ODO are projected to remain at zero through the planning period.

ANNUAL INSTRUMENT APPROACHES

An annual instrument approach (AIA) is defined by the FAA as "an approach to an airport with intent to land by an aircraft in accordance with IFR flight plan, when visibility is less than three miles and/or when the ceiling is at or below the minimum approach altitude." An aircraft must follow one of the published instrument approach procedures at an airport in order to qualify as an instrument approach. Practice or training approaches do not count as AIAs, nor do instrument approaches that occur in visual conditions.

In low visibility conditions or poor weather conditions, pilots can only complete flight training operations under instrument flight rules (IFR). Local operations are not typically performed during IFR conditions. As a result, an estimate of the total number AIAs can be made based on a percentage of itinerant operations regardless of poor weather conditions. An estimate of 2.5 percent of total itinerant (general aviation, air taxi, and military) operations is utilized to forecast AIAs at ODO, as presented in **Table 20**.

TABLE 20 | Annual Instrument Approaches

Year	Annual Instrument Approaches	Itinerant Operations	Ratio
2022	650	26,000	2.50%
2027	740	29,600	2.50%
2032	790	31,500	2.50%
2042	890	35,700	2.50%

Source: FAA Form 5010; Coffman Associates analysis

PEAK PERIOD FORECASTS

Forecasts of peak activity at an airport are important in determining facility requirements for the future. The peaking periods used to develop the capacity analysis and facility requirements are as follows: peak month, design day, busy day, and design hour. **Peak month** refers to the calendar month in which traffic activity is highest. The **design day** is the average day in the peak month, while the **busy day** is reflective of the busiest day of a typical week during the peak month. Finally, **design hour** refers to the peak hour within the design day.

Because ODO is not equipped with an airport traffic control tower, precise operational data is not available for establishing true peaking characteristics. For this reason, estimated peaking characteristics have been developed based on knowledge of other general aviation airports with control towers. For this study, the peak month was estimated at ten percent of the annual operations, which resulted in 7,866 operations during the peak month of the base year. By the end of the planning period, 105,700 operations are projected to occur during the peak month. The design day is estimated by dividing the peak month by the average number of days in a month, and the busy day is calculated at 1.25 times the design day. The design hour is estimated at 15 percent of the design day. Peak period forecasts are presented in **Table 21**.

TABLE 21 | Peak Period Forecasts

	YEAR			
	2022	2027	2032	2042
Annual	78,664	87,300	93,100	105,700
Peak Month	7,866	8,730	9,310	10,570
Design Day	254	282	300	341
Design Hour	38	42	45	51
Busy Day	317	349	369	413

Sources: FAA TAF, Coffman Associates analysis

FORECAST COMPARISON TO THE TERMINAL AREA FORECAST

A summary of the selected forecasts is presented on **Exhibit 21**. The FAA reviews the forecasts presented in this aviation planning study for comparison to the *Terminal Area Forecast*. The forecasts are considered consistent with the TAF if they meet the following criteria:

- Forecasts differ by less than 10 percent in the 5-year forecast period and 15 percent in the 10-year forecast period, or
- Forecasts do not affect the timing or scale of an airport project, or
- Forecasts do not affect the role of the airport as defined in the current version of FAA Order 5090.3, *Field Formulation of the National Plan of Integrated Airport Systems*.

If the forecasts exceed these parameters, they may be sent to FAA headquarters in Washington, D.C. for further review. **Table 22** presents the direct comparison of the planning forecasts prepared in this study with the TAF published in March 2022. The selected operations forecast is within the FAA TAF tolerance for both the 5- and 10-year forecast periods. In terms of based aircraft, the 5- and 10-year forecasts are outside the TAF tolerance, at 16.60 percent and 16.18 percent difference, respectively. This discrepancy is likely a result of the TAF count of based aircraft in 2022 being greater than what is actually reported by the airport. Because the planning study forecasts are built on this base year total, it is reasonable that a greater difference will result in the forecast years.

TABLE 22 | Forecast Comparison to the *Terminal Area Forecast*

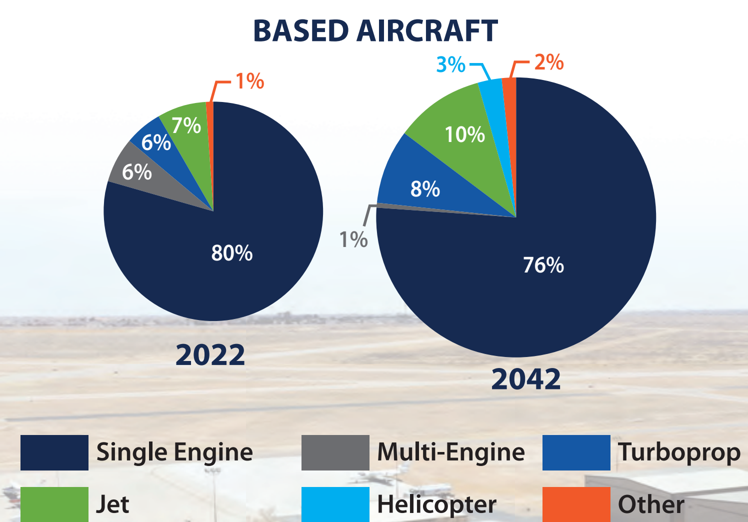
	Base Year	FORECAST			CAGR
	2022	2027	2032	2042	2022-2042
Total Operations					
Selected Forecast	78,664	87,300	93,100	105,700	1.5%
2022 FAA TAF	79,460	83,225	87,163	95,577	0.9%
% Difference	1.01%	4.78%	6.59%	10.06%	
Based Aircraft					
Selected Forecast	108	116	125	144	1.4%
2022 FAA TAF	125	137	147	167	15.6%
% Difference	14.59%	16.60%	16.18%	14.79%	
CAGR - Compound annual growth rate					

Source: Coffman Associates analysis

CRITICAL AIRCRAFT

The critical aircraft is defined as an aircraft conducting at least 500 itinerant operations at an airport or the most regularly scheduled aircraft in commercial service. When planning for future airport facilities, it is important to consider the demands of aircraft operating at the airport currently or anticipated to operate in the future. Caution must be exercised to ensure that short-term development does not preclude the long-term needs of the airport. Thus, a balance must be struck between the facility needs of aircraft currently operating at an airport versus those projected to operate.

	BASE YEAR	2027	2032	2042
BASED AIRCRAFT				
Single Engine	86	92	99	109
Multi-Engine	7	5	3	1
Turboprop	6	8	9	12
Jet	8	9	11	15
Helicopter	0	1	2	4
Other	1	1	2	2
TOTAL BASED AIRCRAFT	**108**	**116**	**125**	**144**
ANNUAL OPERATIONS				
Itinerant				
Air Carrier	0	0	0	0
Other Air Taxi	664	750	930	1,240
General Aviation	26,000	29,600	31,500	35,700
Military	0	0	0	0
Total Itinerant*	***26,664***	***30,400***	***32,400***	***36,900***
Local				
General Aviation	52,000	56,900	60,700	68,800
Military	0	0	0	0
Total Local*	***52,000***	***56,900***	***60,700***	***68,800***
Total Annual Operations	**78,664**	**87,300**	**93,100**	**105,700**
ANNUAL INSTRUMENT APPROACHES (AIA)	**650**	**740**	**790**	**890**
PEAKING				
Total Annual Operations	78,664	87,300	93,100	105,700
Peak Month	7,866	8,730	9,310	10,570
Design Day	254	282	300	341
Design Hour	38	42	45	51
Busy Day	317	349	369	413



*Figures have been rounded

AIRCRAFT CLASSIFICATION

The selection of appropriate FAA design standards for the development and location of airport facilities is based primarily upon the characteristics of the aircraft which are currently using, or are expected to use, an airport. The critical aircraft is used to define the design parameters for an airport. The critical aircraft may be a single aircraft type or, more commonly, is a composite aircraft representing a collection of aircraft with similar characteristics. The critical aircraft is defined by three parameters: Aircraft Approach Category (AAC), Airplane Design Group (ADG), and Taxiway Design Group (TDG). FAA AC 150/5300-13B, *Airport Design*, describes the following airplane classification systems, the parameters of which are presented on **Exhibit 22**.

Aircraft Approach Category (AAC) | A grouping of aircraft based on a reference landing speed (V_{REF}), if specified, or if V_{REF} is not specified, 1.3 times stall speed (V_{SO}) at the maximum certificated landing weight. V_{REF}, V_{SO}, and the maximum certificated landing weight are those values as established for the aircraft by the certification authority of the country of registry.

The AAC generally refers to the approach speed of an aircraft in landing configuration. The higher the approach speed, the more restrictive the applicable design standards. The AAC, depicted by a letter A through E, is the aircraft approach category and relates to aircraft approach speed (operational characteristic). The AAC generally applies to runways and runway-related facilities, such as runway width, runway safety area (RSA), runway object free area (ROFA), runway protection zone (RPZ), and separation standards.
Aircraft in AAC A and B are further distinguished between those weighing more or less than 12,500 pounds. Those under 12,500 pounds are classified as "small" or (s). The applicable design standards for the airport are different based on the "small" classification.

Airplane Design Group (ADG) | The ADG, depicted by a Roman numeral I through VI, is a classification of aircraft which relates to aircraft wingspan or tail height (physical characteristic). When the aircraft wingspan and tail height fall in different groups, the higher group is used. The ADG influences design standards for taxiway safety area (TSA), taxiway object free area (TOFA), apron wingtip clearance, and various separation distances.

Taxiway Design Group (TDG) | A classification of airplanes based on outer-to-outer Main Gear Width (MGW) and Cockpit to Main Gear (CMG) distance. The TDG relates to the undercarriage dimensions of the design aircraft. The taxiway design elements determined by the application of the TDG include the taxiway width, taxiway edge safety margin, taxiway shoulder width, taxiway fillet dimensions, and, in some cases, the separation distance between parallel taxiways/taxilanes. Other taxiway elements, such as the TSA, TOFA, taxiway/taxilane separation to parallel taxiway/taxilanes or fixed or movable objects, and taxiway/taxilane wingtip clearances, are determined solely based on the wingspan (ADG) of the design aircraft utilizing those surfaces. It is appropriate for taxiways to be planned and built to different TDG standards based on expected use.

Exhibit 23 presents the aircraft classification of the most common aircraft in operation today.

AIRCRAFT APPROACH CATEGORY (AAC)

Category	Approach Speed
A	less than 91 knots
B	91 knots or more but less than 121 knots
C	121 knots or more but less than 141 knots
D	141 knots or more but less than 166 knots
E	166 knots or more

AIRPLANE DESIGN GROUP (ADG)

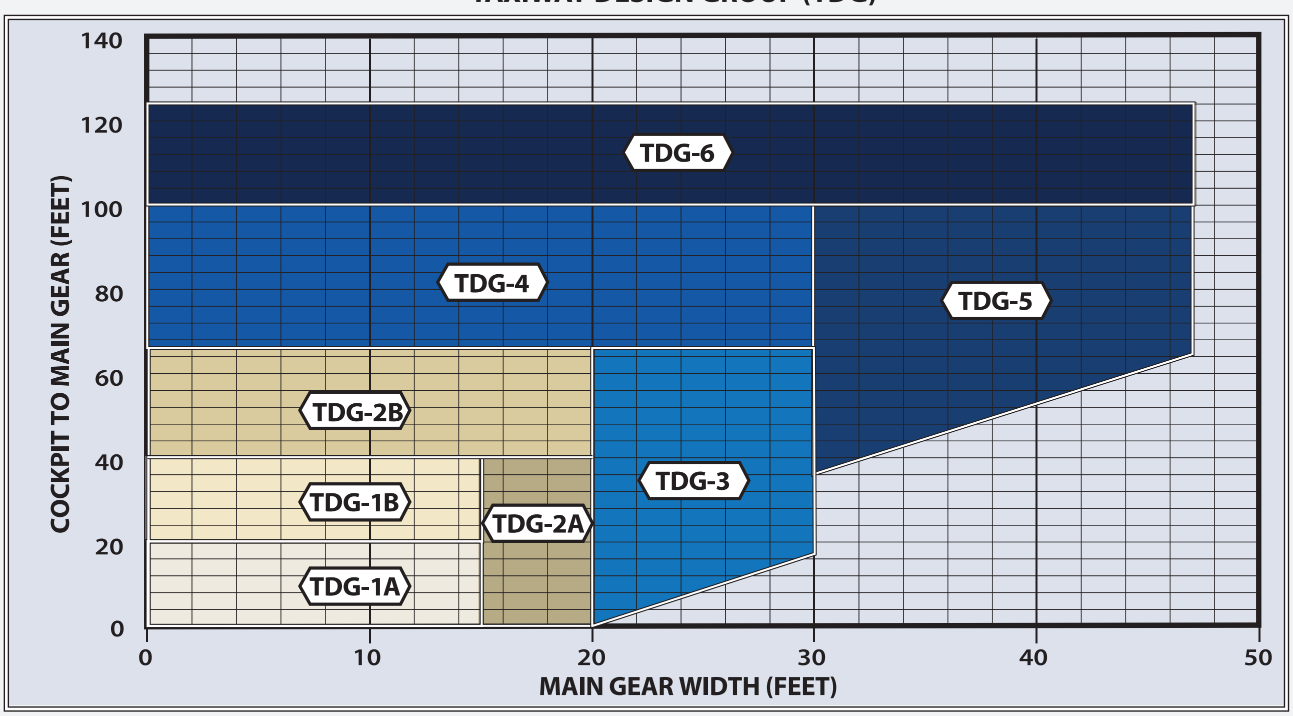
Group #	Tail Height (ft)	Wingspan (ft)
I	<20	<49
II	20≤30	49≤79
III	30≤45	79≤118
IV	45≤60	118≤171
V	60≤66	171≤214
VI	66≤80	214≤262

VISIBILITY MINIMUMS

RVR* (ft)	Flight Visibility Category (statute miles)
VIS	3-mile or greater visibility minimums
5,000	Not lower than 1-mile
4,000	Lower than 1-mile but not lower than ¾-mile
2,400	Lower than ¾-mile but not lower than ½-mile
1,600	Lower than ½-mile but not lower than ¼-mile
1,200	Lower than ¼-mile

***RVR**: Runway Visual Range

TAXIWAY DESIGN GROUP (TDG)



Source: FAA AC 150/5300-13B, Airport Design

A-I

Aircraft	TDG
Beech Baron 55	1A
Beech Bonanza	**1A**
Cessna 150, 172	1A
Eclipse 500	1A
Piper Archer, Seneca	1A

B-I

Aircraft	TDG
Beech Baron 58	**1A**
Beech King Air 90	1A
Cessna 421	1A
Cessna Citation CJ1 (525)	1A
Cessna Citation 1 (500)	2
Piper Cheyenne III	2

B-II 12,500 lbs. or less

Aircraft	TDG
Cessna 441 Conquest	1A
Beech Super King Air 200	**2**
Cessna Citation CJ2 (525A)	2

B-II over 12,500 lbs.

Aircraft	TDG
Falcon 10, 20, 50	1B
Hawker 800, 800XP, 850XP, 4000	1B
Cessna Citation CJ4 (525C)	**1B**
Beech Super King Air 350	2
Beech 1900	2
Falcon 900, 2000	2
Cessna Citation CJ3 (525B), Bravo (550), V (560)	2

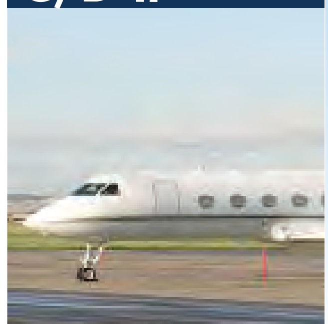
A/B-III

Aircraft	TDG
Bombardier Dash 7 (A-III)	3
Bombardier Dash 8	3
Bombardier Global 5000, 6000, 7000, 8000	**2**
Falcon 6X, 7X, 8X	2
ATR 72	2

C/D-I

Aircraft	TDG
Lear 25, 31, 45, 55, **60**	**1B**
Israeli Westwind	1B
Learjet 35, 36 (D-I)	1B
Piaggio Avanti II	2

C/D-II

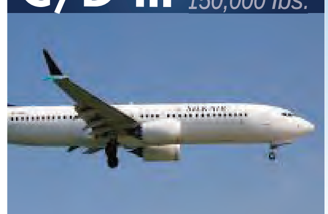


Aircraft	TDG
Cessna Citation VII, X+	1B
Lear 70, 75	1B
Gulfstream II	1B
CRJ-200	1B
Gulfstream III	2
ERJ-135, 140, 145	2
CRJ-700	2
Gulfstream IV, 350, 450 (D-II)	2

C/D-III less than 150,000 lbs.

Aircraft	TDG
Gulfstream V	2
CRJ-900, 1000	2
Boeing 737-700, BBJ	3
ERJ-170, 175, 190, 195	3
Gulfstream G500, 550, 600, **650 (D-III)**	**2**
MD-81, 82, 87 (D-III)	4

C/D-III over 150,000 lbs.

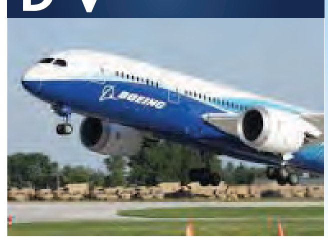


Aircraft	TDG
Airbus A319-100, 200	3
Boeing 737 -800, 900, BBJ2 (D-III)	**3**
MD-83, 88 (D-III)	4

C/D-IV

Aircraft	TDG
Airbus A300-100, 200, 600	5
Boeing 757-200	4
Boeing 767-300, **400**	**5**
MD-11	6

D-V



Aircraft	TDG
Airbus A330-200, 300	5
Boeing 787-8, 9	**5**
Airbus A340-500, 600	6
Boeing 747-100 - 400	5
Boeing 777-300	6

Note: Aircraft pictured is identified in bold type.

AIRPORT AND RUNWAY CLASSIFICATION

Airport and runway classifications, along with the aircraft classifications defined previously, are used to determine the appropriate FAA design standards to which the airfield facilities are to be designed and built.

Airport Reference Code (ARC) | An airport designation that signifies the airport's highest Runway Design Code (RDC) minus the third (visibility) component of the RDC. The ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely on the airport.

Runway Design Code (RDC) | A code signifying the design standards to which the runway is to be built. The RDC is based upon planned development and has no operational component. The AAC, ADG, and runway visual range (RVR) are combined to form the RDC of a particular runway. The RDC provides the information needed to determine certain design standards that apply. The first component, depicted by a letter, is the AAC and relates to aircraft approach speed (operational characteristics). The second component, depicted by a Roman numeral, is the ADG and relates to either the aircraft wingspan or tail height (physical characteristics), whichever is most restrictive. The third component relates to the visibility minimums expressed by RVR values in feet of 1,200 (⅛-mile); 1,600 (¼-mile); 2,400 (½-mile); 4,000 (¾-mile); and 5,000 (1-mile). The RVR values approximate standard visibility minimums for instrument approaches to the runways. The third component should read "VIS" for runways designed for visual approach use only.

Approach Reference Code (APRC) | A code signifying the current operational capabilities of a runway and associated parallel taxiway with regard to landing operations. Like the RDC, the APRC is composed of the same three components: the AAC, ADG, and RVR. The APRC describes the current operational capabilities of a runway under particular meteorological conditions where no special operating procedures are necessary, as opposed to the RDC, which is based upon planned development with no operational component.

The APRC for a runway is established based upon the minimum runway-to-taxiway centerline separation. Each of the runways at ODO has a partial-parallel taxiway. Taxiway G is located 400 feet from the Runway 11-29 centerline. Both runway ends have a non-precision approach with ¾-mile visibility minimums. Based on these conditions, the APRC for Runway 11-29 is D/IV/4000 and D/V/4000. Runway 2-20 also has a partial-parallel taxiway (Taxiway D) that has a runway/taxiway separation distance of 300 feet. Runway 20 has a non-precision approach with 1-mile visibility minimums. Based on these conditions, the APRC for Runway 2-20 is B/III/4000 and D/II/4000. Taxiway G also serves as a partial-parallel taxiway on the west side of Runway 16-34, with a separation of 300 feet. There are no published instrument approaches to this runway; thus, the APRC is B/III/4000 and D/II/4000.

Departure Reference Code (DPRC) | A code signifying the current operational capabilities of a runway and associated parallel taxiway with regard to take-off operations. The DPRC represents those aircraft that can take off from a runway while any aircraft are present on adjacent taxiways, under particular meteorological conditions with no special operating conditions. The DPRC is similar to the APRC but is composed of two components: AAC and ADG. A runway may have more than one DPRC depending on the parallel taxiway separation distance.

The current runway/taxiway centerline separation between Taxiway G and Runway 11-29 of 400 feet results in a DPRC of D/IV and D/V. For Runways 2-20 and 16-34, the 300-foot separation between them and their associated partial-parallel taxiways results in a DPRC of B/III and D/II for each runway.

AIRPORT CRITICAL AIRCRAFT

As stated previously, it is critical to have an accurate understanding of the types of aircraft that operate at the airport currently and are expected to use the airport in the future. Aircraft type can have a significant impact on airport design criteria and the type of facilities necessary to accommodate the aircraft that are utilizing the airport most frequently.

The most recent annual data was obtained from the FAA's Traffic Flow Management System Counts (TFMSC), a database maintained by the FAA to monitor the type of aircraft and frequency of usage at airports. Typically, information is added to the database when pilots file flight plans and/or when flights are detected by the National Airspace System (NAS) on radar. The TFMSC includes data for general aviation, commercial service (air carrier and air taxi), and military aircraft. Although the program can identify the aircraft operating under IFR-filed flight plans and/or on radar, it does not account for all aircraft operating without a flight plan due to limited radar coverage. Thus, it is likely the airport experiences additional operations that are not recorded in the TFMSC. Despite this likelihood for incomplete operational data, the TFMSC is a valuable resource for identifying the primary aircraft users and type of aircraft operating at the airport on a regular basis. Additionally, the TFMSC does provide an accurate reflection of IFR activity. Operators of high-performance aircraft, such as turboprops and jets, tend to file flight plans at a high rate. **Exhibit 24** details the TFMSC operational mix at ODO since 2012.

Existing and Ultimate Critical Aircraft

A TFMSC report was prepared to identify the primary aircraft types operating at ODO. The data is limited as the TFMSC reports just 3,962 operations in 2021, the last full year of available data, which is only a small percentage of the total operations occurring at the airport. Most of the operations (49 percent) reported in the TFMSC are by aircraft in B-II, which includes representative aircraft such as the Citation V/Sovereign and the King Air 200/300/350 series. Aircraft in B-I are the next most frequent operators, according to the data, with 1,300 operations in 2021, followed by aircraft in C-II with 284 operations. AAC B aircraft have exceeded 500 annual operations at ODO since 2012. Therefore, for the purposes of this study, AAC B aircraft will be considered the critical AAC. Reported operations within ADG II are also well above the operational threshold; therefore, the representative critical ADG is II. Based on historic information provided in the TFMSC, it is reasonable to identify B-II as the primary runway's existing critical aircraft, with the King Air 200/300/350 serving as the representative aircraft.

In terms of the ultimate critical aircraft, it is important to consider the growth potential that exists at ODO now and over the next 20 years, as well as that of the city and region. The City of Odessa and the surrounding area have experienced significant growth, and this trend is expected to continue. Nationally, trends are moving towards larger and faster jets, and ODO already accommodates operations by AAC C/D aircraft. Airfield design standards for AAC C and D aircraft are grouped together within FAA's Airport Design

ARC	Aircraft	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
A-I	A36 Bonanza	0	0	0	6	0	2	2	0	2	0
	Cirrus Vision Jet	0	0	0	0	0	0	4	4	20	52
	Eclipse 400/500	6	2	4	20	16	12	24	10	28	16
	Epic Dynasty	2	8	18	8	6	6	2	0	6	4
	Kodiak Quest	4	0	2	2	2	2	0	2	14	2
	Lancair Evolution/Legacy	2	0	0	0	8	4	0	0	0	2
	Piper Malibu/Meridian	56	20	92	42	36	56	216	192	110	110
	Socata TBM 7/850/900	42	30	18	26	38	22	28	34	44	50
	Total	**112**	**60**	**134**	**104**	**106**	**104**	**276**	**242**	**224**	**236**
A-II	Cessna Caravan	4	2	2	4	0	0	4	6	2	20
	De Havilland Twin Otter	0	0	0	2	0	0	0	2	0	0
	Pilatus PC-12	332	274	230	180	264	176	162	148	92	110
	Total	**336**	**276**	**232**	**186**	**264**	**176**	**166**	**156**	**94**	**130**
A-III	De Havilland Dash 7	0	0	0	0	0	0	0	0	2	0
	Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**
B-I	Aero Commander 680	0	0	0	0	0	0	2	0	0	0
	Beech 99 Airliner	0	0	0	0	2	0	0	0	0	0
	Beechjet 400	18	10	26	10	12	14	14	20	12	18
	Cessna 425 Corsair	4	10	16	6	2	22	18	24	4	8
	Citation CJ1	8	26	134	96	64	68	62	86	52	90
	Citation I/SP	24	18	30	56	32	10	46	36	26	18
	Citation M2	0	0	0	0	0	0	20	78	42	78
	Citation Mustang	90	152	12	6	10	26	26	10	28	48
	Falcon 10	0	0	0	2	0	24	34	16	4	8
	Hawker 1000	0	0	0	0	0	0	14	0	0	0
	Honda Jet	0	0	0	0	2	0	2	10	6	18
	King Air 90/100	180	716	574	690	936	1,036	1,936	1,842	1,172	942
	L-29 Delfin	0	0	0	0	0	2	0	0	0	0
	Mitsubishi MU-2	8	52	38	4	10	22	8	2	4	0
	Phenom 100	10	2	6	22	20	26	66	26	20	42
	Piaggio Avanti	2	2	54	72	18	66	68	78	16	16
	Piper Cheyenne	64	34	46	16	8	32	24	16	18	6
	Premier 1	6	8	2	14	16	10	14	28	12	8
	T-27 Tucano	0	0	0	2	0	2	0	0	0	0
	Total	**414**	**1,030**	**938**	**996**	**1,132**	**1,360**	**2,354**	**2,272**	**1,416**	**1,300**
B-II	Aero Commander 690	16	20	18	0	6	10	14	6	2	8
	Air Tractor	0	0	0	2	0	0	0	0	0	0
	Cessna Conquest	14	22	36	10	34	2	32	42	12	14
	Challenger 300	20	4	12	14	8	12	12	50	12	54
	Citation CJ2/CJ3/CJ4	18	24	22	62	30	30	198	228	114	118
	Citation II/SP/Latitude	82	202	276	308	194	234	354	530	408	466
	Citation V/Sovereign	306	378	402	548	550	472	470	506	274	332
	Citation X	4	8	14	6	2	8	6	20	14	0
	Citation XLS	46	8	40	42	52	38	54	46	42	62
	Dornier 328	0	0	0	0	20	0	0	0	0	6
	Embraer EMB-110/120	0	0	0	2	2	0	0	0	0	0
	Falcon 20/50	10	2	4	112	140	162	174	316	156	148
	Falcon 2000	0	6	10	6	0	4	14	12	24	18

ARC	Aircraft	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
B-II	Falcon 900	2	0	0	0	0	2	6	10	2	14
	Hawker 4000	0	2	0	0	0	0	0	0	0	0
	King Air 200/300/350	242	308	336	494	656	696	584	712	478	496
	King Air F90	16	14	46	130	114	142	134	132	40	10
	Phenom 300	130	174	130	142	108	180	118	130	76	132
	Pilatus PC-24	0	0	0	0	0	0	0	0	0	6
	Swearingen merlin	8	4	10	34	44	4	10	8	4	38
	Total	**914**	**1,176**	**1,356**	**1,912**	**1,960**	**1,996**	**2,180**	**2,748**	**1,658**	**1,922**
B-III	Bombardier Global Express	0	0	0	0	0	0	0	0	0	2
	Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**
C-I	Learjet 20 Series	0	4	2	0	0	0	0	0	0	0
	Learjet 31	16	0	8	0	2	4	2	2	2	6
	Learjet 40 Series	30	24	50	34	40	158	210	140	30	30
	Learjet 50 Series	10	6	26	96	36	40	50	38	4	4
	Learjet 60 Series	6	2	10	4	2	10	42	14	18	34
	Westwind II	2	0	0	8	6	6	2	6	2	2
	Total	**64**	**36**	**96**	**142**	**86**	**218**	**306**	**200**	**56**	**76**
C-II	Challenger 600/604	0	2	8	4	12	12	10	16	4	2
	Citation III/VI	2	6	42	36	110	120	124	90	68	24
	Embraer 500/450 Legacy	0	0	0	0	0	4	2	2	10	6
	Embraer ERJ-135/140/145	0	0	0	0	2	0	0	0	2	0
	Gulfstream 100/150	0	0	4	6	4	14	108	16	68	94
	Gulfstream 280	0	0	0	0	6	8	8	14	72	118
	Gulfstream G-III	0	0	0	0	2	2	0	0	0	0
	Hawker 800 (Formerly Bae-125-800)	4	12	12	12	6	16	10	24	30	22
	Learjet 70 Series	0	0	0	0	2	0	8	14	14	18
	Total	**6**	**20**	**66**	**58**	**144**	**176**	**270**	**176**	**268**	**284**
C-III	Boeing 737 (200 thru 700 series)	0	0	2	0	0	0	0	0	0	0
	Total	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
C-IV	C-130 Hercules	0	0	0	0	2	0	0	0	0	0
	Total	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**
D-I	F-22 Raptor	0	0	0	2	0	0	0	0	0	0
	Learjet 35/36	8	18	20	12	12	22	18	34	14	10
	T-38 Talon	2	0	0	0	0	0	0	0	0	0
	Total	**10**	**18**	**20**	**14**	**12**	**22**	**18**	**34**	**14**	**10**
D-II	Gulfstream 200	2	2	10	2	0	10	6	0	0	2
	Gulfstream 450	0	0	6	2	2	8	2	8	0	0
	Total	**2**	**2**	**16**	**4**	**2**	**18**	**8**	**8**	**0**	**2**
D-III	Gulfstream 500/600	0	2	0	0	2	4	4	4	0	0
	Total	**0**	**2**	**0**	**0**	**2**	**4**	**4**	**4**	**0**	**0**

Exhibit 24
HISTORICAL TURBOPROP AND JET OPERATIONS

ARC CODE SUMMARY

ARC CODE	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
A-I	112	60	134	104	106	104	276	242	224	236
A-II	336	276	232	186	264	176	166	156	94	130
A-III	0	0	0	0	0	0	0	0	2	0
B-I	414	1,030	938	996	1,132	1,360	2,354	2,272	1,416	1,300
B-II	914	1,176	1,356	1,912	1,960	1,996	2,180	2,748	1,658	1,922
B-III	0	0	0	0	0	0	0	0	0	2
C-I	64	36	96	142	86	218	306	200	56	76
C-II	6	20	66	58	144	176	270	176	268	284
C-III	0	0	2	0	0	0	0	0	0	0
C-IV	0	0	0	0	2	0	0	0	0	0
D-I	10	18	20	14	12	22	18	34	14	10
D-II	2	2	16	4	2	18	8	8	0	2
D-III	0	2	0	0	2	4	4	4	0	0
Total	1,858	2,620	2,860	3,416	3,710	4,074	5,582	5,840	3,732	3,962

APPROACH CATEGORY

AC	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
A	448	336	366	290	370	280	442	398	320	366
B	1,328	2,206	2,294	2,908	3,092	3,356	4,534	5,020	3,074	3,224
C	70	56	164	200	232	394	576	376	324	360
D	12	22	36	18	16	44	30	46	14	12
Total	1,858	2,620	2,860	3,416	3,710	4,074	5,582	5,840	3,732	3,962

DESIGN GROUP

DG	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
I	600	1,144	1,188	1,256	1,336	1,704	2,954	2,748	1,710	1,622
II	1,258	1,474	1,670	2,160	2,370	2,366	2,624	3,088	2,020	2,338
III	0	2	2	0	2	4	4	4	2	2
IV	0	0	0	0	2	0	0	0	0	0
Total	1,858	2,620	2,860	3,416	3,710	4,074	5,582	5,840	3,732	3,962

Source: TFMSC 2012-2021 - Data normalized annually

standards, and the TFMSC reports 372 combined operations by AAC C/D aircraft in 2021. Operations by these aircraft have been trending up over the last 10 years, and in 2018 they exceeded the 500 operations threshold. While ADG II aircraft have been the most frequent operators at ODO over the last 10 years, it is not unreasonable to anticipate larger airplanes in design group III to operate in the future, especially if pavement strengths are increased on the runways (to be discussed in the next section). Additionally, the NPIAS classifies ODO as a National Airport, and the TASP classifies it as a Business/Corporate airport. These designations are given to airports which have a high level of business jet/turbojet activity and which should be planned and designed to accommodate growth in these segments. For these reasons, the ultimate critical aircraft is set within ARC C-III, represented by a Gulfstream 650 (G650).

As mentioned in the Inventory section, for primary runways that provide less than 95 percent wind coverage for specific crosswind components, a crosswind runway may be justified. Based on wind data sourced from the on-airport ASOS, the primary runway at ODO provides for less than 95 percent crosswind coverage in the 10.5 and 13 knot conditions, which will be further explained and expanded later in the Runway Orientation portion of the Facility Requirements section. As such, a crosswind or secondary runway designed to B-II standards is justified. Therefore, the existing and ultimate critical aircraft for the crosswind runway at ODO is within ARC B-II and represented by the King Air 200/300/350.

Existing and Ultimate Airfield Design

Each runway at an airport is assigned an RDC. The RDC relates to specific FAA design standards that should be planned in relation to each runway, regardless of whether or not the airport currently meets the appropriate design standards (to be discussed in the next section).

Runway 11-29 has historically been considered the airport's primary runway. It measures 6,200 feet long by 100 feet wide with an APRC and DPRC capable of accommodating up to ARC D-V aircraft. Both runway ends provide a GPS LPV approach with visibility minimums down to ¾-mile. The existing ARC for ODO is B-II, and the resulting RDC for Runway 11-29 is B-II-4000 and the existing TDG is 2. Based on the ultimate critical aircraft (C-III), planning for the primary runway should reflect RDC C-III-2400 design standards, which accounts for the potential for the airport to pursue visibility minimums down to ½-mile.

ODO also has two other runways, Runway 2-20 and Runway 16-34, both of which are designed to B-II standards. As mentioned, the FAA will support a crosswind runway if the primary runway provides less than 95 percent wind coverage; however, they will not support two crosswind runways, or a crosswind and a secondary runway, unless operational demand warrants it. This is not the case at ODO, as evidenced by the lack of federal funding support for maintaining Runway 2-20. However, based on current wind data, Runway 2-20 provides better crosswind coverage than Runway 16-34. The alternatives analysis will consider the pros/cons of maintaining the current three-runway system or decommissioning one runway. This study will also evaluate whether Runway 11-29 should remain as the primary runway or if Runway 2-20 or Runway 16-34 should be designated the primary. Whichever runway is maintained as the crosswind should be designed to B-II-5000 standards in the existing and ultimate condition. Another option is for Ector County to self-fund the maintenance of an 'additional' runway (the third runway not considered 'primary' or 'crosswind'), like what occurs now with Runway 2-20. If the decision is made to maintain all three runways, the 'additional' runway should be designed to meet B-II standards now and in the future.

All taxiways are at least 35 feet wide, meeting TDG 2 standards. These taxiways should continue to be designed to TDG 2 standards.

Table 23 summarizes the airport and runway classification currently and in the future for each of the runways. The next section, Facility Requirements, will outline the airside and landside elements necessary to meeting the aviation needs that have been determined in this forecasting effort.

TABLE 23 | Airport and Runway Classifications

	EXISTING	ULTIMATE
Airport Reference Code (ARC)	B-II	C-III
PRIMARY RUNWAY		
Airport Design Aircraft	King Air 200/300/350	Gulfstream 650
Runway Design Code (RDC)	B-II-4000	C-III-2400
Approach Reference Code (APRC)	D/IV/4000 D/V/4000	D/IV/2400 D/V/2400
Departure Reference Code (DPRC)	D/IV D/V	D/IV D/V
Taxiway Design Group (TDG)	2	2
CROSSWIND RUNWAY		
Airport Design Aircraft	King Air 200/300/350	Same
Runway Design Code (RDC)	B-II-5000	Same
Approach Reference Code (APRC)	B/III/4000 D/II/4000	Same
Departure Reference Code (DPRC)	B/III D/II	Same
Taxiway Design Group (TDG)	2	Same
ADDITIONAL (NON-AIP ELIGIBLE) RUNWAY[1]		
Airport Design Aircraft	King Air 200/300/350	Same
Runway Design Code (RDC)	B-II-VIS	Same
Approach Reference Code (APRC)	B/III/4000 D/II/4000	Same
Departure Reference Code (DPRC)	B/III D/II	Same
Taxiway Design Group (TDG)	2	Same

[1] These standards apply only if the County elects to self-fund maintenance of a third runway

Source: FAA AC 150/5300-13B; Coffman Associates analysis

FACILITY REQUIREMENTS

As detailed in previous sections, an airport contains both airside and landside facilities. Airside facilities consist of the runways, taxiways, approach and departure facilities, navigational aids, lighting, markings, and signage that assist in the ground movement of aircraft. Landside facilities provide the interface between air and ground transportation and include the terminal building, hangars and tiedowns, aircraft parking aprons, automobile parking, and airport support facilities.

Cost-effective, safe, efficient, and orderly development of an airport should rely more upon actual demand than a time-based forecast figure. Thus, in order to develop a plan that is demand-based rather than time-based, a series of planning horizon milestones have been established that take into consideration the reasonable range of aviation demand projections.

It is important to consider that, over time, the actual activity at the airport may be higher or lower than what the annualized forecast portrays. By planning according to activity milestones, the resultant plan can accommodate unexpected shifts or changes in the area's aviation demand. It is important to plan for these milestones so that airport officials can respond to unanticipated changes in a timely fashion. As a result, these milestones provide flexibility while potentially extending this plan's useful life if aviation trends slow over the period.

The most important reason for utilizing milestones is to allow the airport to develop facilities according to need generated by actual demand levels. The demand-based schedule provides flexibility in development, as the schedule can be slowed or expedited according to actual demand at any given time over the planning period. The resultant plan provides airport officials with a financially responsible and needs-based program.

The milestones utilized in the study are:

- Short-Term: 0-5 Years
- Intermediate-Term: 6-10 Years
- Long-Term: 11-20+ Years

AIRSIDE FACILITY REQUIREMENTS

RUNWAY SAFETY AREAS

The FAA has established several imaginary surfaces to protect aircraft operational areas and keep them free from obstructions that could affect the safe operation of aircraft. These surfaces include the runway safety area (RSA), runway object free area (ROFA), runway obstacle free zone (ROFZ), and runway protection zone (RPZ).

It is important that the RSA, ROFA, and ROFZ remain under direct ownership of the airport sponsor to ensure that these areas remain free of obstacles and can be readily accessed by maintenance and safety personnel. The airport should also own or maintain sufficient land use control over RPZs to ensure that the area remains obstacle free. Alternatives to owning RPZs include maintaining positive control through avigation easements or ensuring proper zoning measures are taken to maintain compatible land use.

Existing and ultimate safety areas for each of the runways at ODO are depicted on **Exhibit 25**.

Runway Safety Area (RSA)

The RSA is an established surface surrounding a runway that is designed or prepared to increase safety and decrease potential damage if an aircraft undershoots, overshoots, or makes an excursion from the runway. The RSA is centered upon the runway centerline, and its dimensions are based upon the established RDC. The FAA states within AC 150/5300-13B that the RSA must be cleared and graded and cannot contain hazardous surface variations. In addition, the RSA must be drained either by grading or storm sewers and capable of supporting snow removal and ARFF equipment, as well as the occasional passage of aircraft without damaging the aircraft. The RSA must remain free of obstacles, other than those considered fixed by function, such as runway lights.

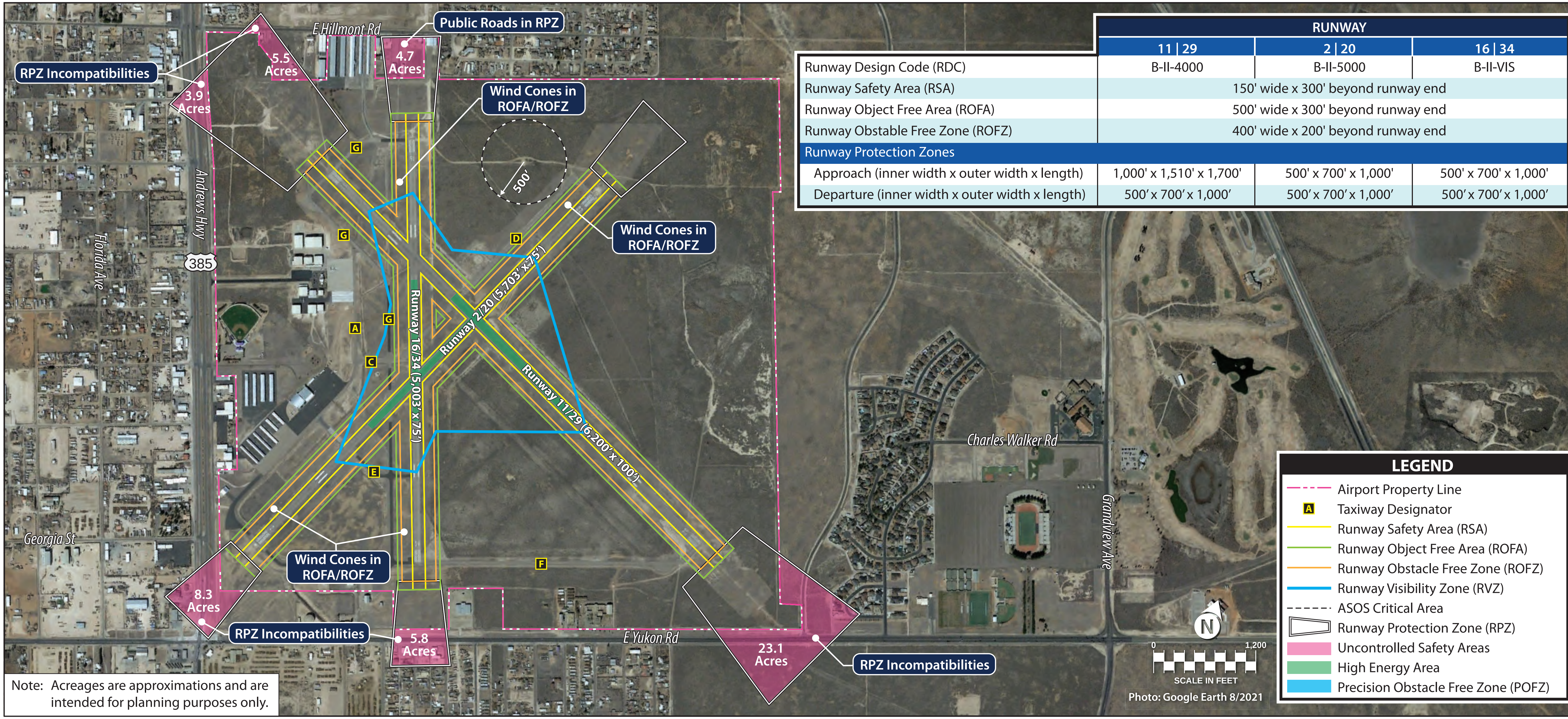
The FAA has placed a higher significance on maintaining adequate RSA at all airports. Under Order 5200.8, effective October 1, 1999, the FAA established the *Runway Safety Area Program*. The Order states, "The objective of the Runway Safety Area Program is that all RSAs at federally obligated airports…shall conform to the standards contained in Advisory Circular 150/5300-13B, *Airport Design*, to the extent practicable." Each Regional Airports Division of the FAA is obligated to collect and maintain data on the RSA for each runway at the airport and perform airport inspections.

The standard RSA dimensions for each of the runways in the existing condition are 150 feet wide and extending 300 feet beyond each end of the runway. For Runways 16-34 and 2-20, these dimensions will also apply in the ultimate condition. However, the RSA dimensions for Runway 11-29 will increase in the ultimate RDC C-III-2400 condition, at 500 feet wide and extending 1,000 feet beyond each end of the runway.

At ODO, the RSA for all runways in both the existing and ultimate conditions is fully contained within airport property and free of obstructions, in accordance with FAA design standards.

Runway Object Free Area (ROFA)

The ROFA can be described as a two-dimensional surface area that surrounds all airfield runways. This area must remain clear of obstructions, with an exception to those that are deemed "fixed by function," such as runway lighting systems. This safety area does not have to be level or graded as the RSA does. However, the ROFA must be clear of any penetrations of the lateral elevation of the RSA. Much like the RSA, the ROFA is centered upon the runway centerline, and its size is determined based upon the established RDC.

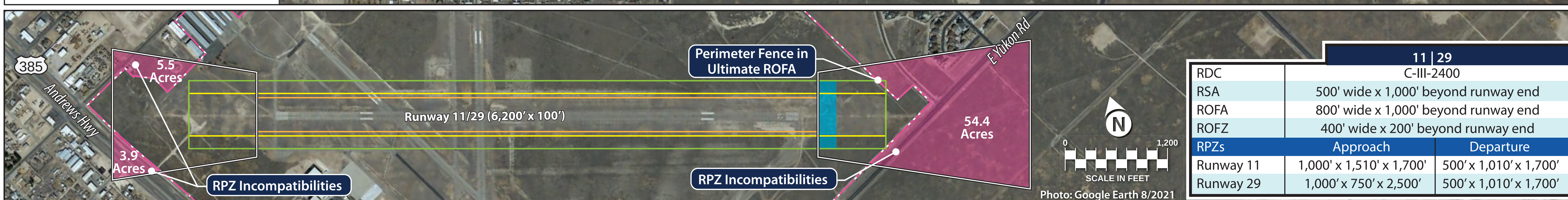


	RUNWAY		
	11 | 29	2 | 20	16 | 34
Runway Design Code (RDC)	B-II-4000	B-II-5000	B-II-VIS
Runway Safety Area (RSA)	150' wide x 300' beyond runway end		
Runway Object Free Area (ROFA)	500' wide x 300' beyond runway end		
Runway Obstable Free Zone (ROFZ)	400' wide x 200' beyond runway end		
Runway Protection Zones			
Approach (inner width x outer width x length)	1,000' x 1,510' x 1,700'	500' x 700' x 1,000'	500' x 700' x 1,000'
Departure (inner width x outer width x length)	500' x 700' x 1,000'	500' x 700' x 1,000'	500' x 700' x 1,000'

LEGEND

- Airport Property Line
- Taxiway Designator
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Obstacle Free Zone (ROFZ)
- Runway Visibility Zone (RVZ)
- ASOS Critical Area
- Runway Protection Zone (RPZ)
- Uncontrolled Safety Areas
- High Energy Area
- Precision Obstacle Free Zone (POFZ)

Note: Acreages are approximations and are intended for planning purposes only.



	11 | 29	
RDC	C-III-2400	
RSA	500' wide x 1,000' beyond runway end	
ROFA	800' wide x 1,000' beyond runway end	
ROFZ	400' wide x 200' beyond runway end	
RPZs	Approach	Departure
Runway 11	1,000' x 1,510' x 1,700'	500' x 1,010' x 1,700'
Runway 29	1,000' x 750' x 2,500'	500' x 1,010' x 1,700'

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ROFA design standards for all three runways measure 500 feet wide and extend 300 feet beyond the end of each runway in the existing condition, and for Runways 2-20 and 16-34 in the ultimate condition. The ROFA dimensions increase for the ultimate RDC C-III-2400 design standards for Runway 11-29, at 800 feet wide and extending 1,000 feet beyond the end of each runway. In the existing condition, the ROFA associated with each runway is fully contained on airport property, but obstructions are present, as noted on **Exhibit 25**. The wind cones adjacent to Runways 2-20 and 16-34 are located within the ROFA, which is a non-standard condition.

In the ultimate condition, the increased ROFA dimensions for Runway 11-29 result in a small portion being located off airport property. Additionally, the perimeter fencing in this area becomes an obstruction to the ROFA. The Alternatives section will include options to correct these non-standard conditions.

Obstacle Free Zones (OFZ*)*

The Runway Obstacle Free Zone (ROFZ) can be defined as a portion of airspace centered about the runway, and its elevation at any point is equal to the elevation of the closest point on the runway centerline. The function of the ROFZ is to ensure the safety of aircraft conducting operations by preventing object penetrations to this portion of airspace. Potential penetrations to this airspace also include taxiing and parked aircraft. Any obstructions within this portion of airspace must be mounted on frangible couplings and be fixed in its position by its function.

The ROFZ extends 200 feet past each end of the runway on the runway centerline. The ROFZ width for runways accommodating large aircraft is 400 feet. This applies to the existing and ultimate condition at ODO. The wind cones adjacent to Runways 2-20 and 16-34 are located within the existing and ultimate ROFZ.

The Precision Obstacle Free Zone (POFZ) is defined as “a volume of airspace above an area beginning at the runway threshold, at the threshold elevation, and centered on the extended runway centerline, 200 feet long by 800 feet wide.” The POFZ is only in effect when the following operational conditions are met:

I. Vertically guided approach
II. Reported ceiling below 250 feet and/or visibility less than ¾-statue mile
III. An aircraft on final approach within two miles of the runway threshold

When these conditions are met, aircraft holding for take-off must hold in such a position so that neither the fuselage nor the tail of the aircraft penetrates the POFZ. However, the wings of the aircraft can penetrate the surface. Currently, no runway end has lower than ¾-statue mile visibility, so a POFZ is not in effect. In the ultimate condition, visibility minimums lower than ¾- mile are planned for Runway 29; therefore, the POFZ would be in effect if the operational conditions above are met. If the minimums were achieved as planned, the Runway 29 POFZ would be unobstructed.

Runway Protection Zone (RPZ)

An RPZ is a trapezoidal area centered on the extended runway centerline beginning 200 feet from the end of the runway. This safety area has been established to protect the end of the runway from airspace penetrations and incompatible land uses. The RPZ dimensions are based upon the established RDC and the visibility minimums serving the runway. While the RPZ is intended to be clear of incompatible objects or land uses, some uses are permitted with conditions and other land uses are prohibited. According to AC 150/5300-13B, the following land uses are permissible within the RPZ:

- Farming that meets the minimum buffer requirements.
- Irrigation channels, as long as they do not attract birds.
- Airport service roads, as long as they are not public roads and are directly controlled by the airport operator.
- Underground facilities, as long as they meet other design criteria, such as RSA requirements, as applicable.
- Unstaffed navigational aids (NAVAIDs) and facilities, such as required for airport facilities that are fixed-by-function in regard to the RPZ.

Any other land uses considered within RPZ land owned by the airport sponsor must be evaluated and approved by the FAA Office of Airports. The FAA has published *Interim Guidance on Land Uses within a Runway Protection Zone* (September 27, 2012), which identifies several potential land uses that must be evaluated and approved prior to implementation. The specific land uses requiring FAA evaluation and approval include:

- Buildings and structures (residences, schools, churches, hospitals or other medical care facilities, commercial/industrial buildings, etc.).
- Recreational land use (golf courses, sports fields, amusement parks, other places of public assembly, etc.).
- Transportation facilities (rail facilities, public roads/highways, vehicular parking facilities, etc.).
- Fuel storage facilities (above and below ground).
- Hazardous material storage (above and below ground).
- Wastewater treatment facilities.
- Above-ground utility infrastructure (i.e., electrical substations), including any type of solar panel installations.

The *Interim Guidance on Land within a Runway Protection Zone* states, “RPZ land use compatibility also is often complicated by ownership considerations. Airport owner control over the RPZ land is emphasized to achieve the desired protection of people and property on the ground. Although the FAA recognizes that in certain situations the airport sponsor may not fully control land within the RPZ, the FAA expects airport sponsors to take all possible measures to protect against and remove or mitigate incompatible land uses.”

Currently, the RPZ review standards are applicable to any new or modified RPZ. The following actions or events could alter the size of an RPZ, potentially introducing an incompatibility:

- An airfield project (e.g., runway extension, runway shift),
- A change in the critical aircraft that increases the RPZ dimensions,
- A new or revised instrument approach procedure that increases the size of the RPZ; and
- A local development proposal in the RPZ (either new or reconfigured).

Since the interim guidance only addresses a new or modified RPZ, some existing incompatibilities, generally non-inhabitable uses like roads can be (but not always) grandfathered under certain circumstances. While it is still necessary for the airport sponsor to take all reasonable actions to meet the RPZ design standard, FAA funding priority for certain actions, such as relocating existing roads in the RPZ, will be determined on a case-by-case basis.

RPZs have further been designated as approach and departure RPZs. The approach RPZ is a function of Aircraft Approach Category (AAC) and approach visibility minimums associated with the approach runway end. The departure RPZ is a function of the AAC and departure procedures associated with the runway. For a particular runway end, the more stringent RPZ requirements (usually associated with the approach RPZ) will govern the property interests and clearing requirements that the airport sponsor should pursue. None of the runways at ODO have displaced thresholds, so the approach and departure RPZs on each runway occur in the same location 200 feet from the end of each runway. For planning purposes, the approach RPZ was used to create the most restrictive condition. The existing and ultimate RPZs at ODO are presented on **Exhibit 25** and detailed further in **Table 24**.

TABLE 24 | Runway Protection Zones (RPZ) Summary

RPZ	Visibility Minimums	Uncontrolled RPZ	Notes/Incompatibilities
EXISTING CONDITION			
Runway 11	¾ mile	9.4 acres	Portions of the RPZ extend beyond airport property and are uncontrolled; businesses and a residence present; Andrews Highway and Hillmont Road traverse the RPZ.
Runway 29	¾ mile	23.1 acres	A portion of the RPZ is uncontrolled; residential land uses in RPZ; RPZ encompasses E. Yukon Road and other public roadways.
Runway 2	Visual	8.3 acres	A portion of the RPZ is uncontrolled; RPZ contains businesses and encompasses Andrews Highway.
Runway 20	1-mile	N/A	Fully contained on airport property; free of incompatible land uses.
Runway 16	Visual	4.7 acres	A portion of the RPZ is uncontrolled; RPZ contains businesses/hangars.
Runway 34	Visual	5.8 acres	A portion of the RPZ is uncontrolled; residential and business land uses in RPZ; RPZ encompasses E. Yukon Road and other public roadways.
ULTIMATE CONDITION*			
Runway 11	¾ mile	9.4 acres	Portions of the RPZ extend beyond airport property and are uncontrolled; businesses and a residence present; Andrews Highway and Hillmont Road traverse the RPZ.
Runway 29	½ mile	54.4 acres	A portion of the RPZ is uncontrolled; residential land uses in RPZ; RPZ encompasses E. Yukon Road and other public roadways.

* The ultimate RPZs associated with Runways 2-20 and 16-34 are the same as the existing condition
Note: Acreages are approximations
Source: Coffman Associates analysis

As detailed in the table, all but one of the existing condition RPZs extend off airport property, with the exception being the Runway 20 RPZ. Each of the RPZs also contains incompatible land uses including residences, businesses, and public roads. In the ultimate condition, additional property within the Runway 29 RPZ is uncontrolled. Presently, the public roads are considered grandfathered and are therefore allowed to remain within the RPZs. However, if a change to the runway environment occurs, such as what is proposed in the ultimate condition with Runway 11-29, the FAA may consider the roads located within these RPZs to be incompatible. Actions that constitute a change to the runway environment include extension or relocation, or the application of lower visibility minimums which would alter the size of the RPZ. While exceptions may be made under certain circumstances (i.e., the road has a low traffic volume), the decision to allow public roadways within an RPZ lies solely with the FAA. The various structures (residences, businesses, and hangars) located within the RPZs are considered incompatible uses, and options in the next section will evaluate different scenarios to mitigate these non-standard conditions.

The FAA recommends that airports have fee simple ownership of the RPZ land where feasible. If fee simple acquisition of RPZ land is not feasible, then the airport should pursue acquisition of an avigation easement and implement land use control measures, such as zoning, to protect the airport. In the next section, different options for maintaining control of the RPZs and keeping them free of incompatible uses will be explored.

RUNWAY ORIENTATION

A runway's designation is based upon its magnetic headings, which are determined by the magnetic declination for the area. The magnetic declination in the area of ODO is 5° 53'E. Primary Runway 11-29 has a true heading of 121°/301°. Adjusting for the magnetic declination, the current magnetic heading of the runway is 115°/295°. Thus, the current runway designation should be maintained in the short-term but should be redesignated as Runway 12-30 in approximately 8-10 years. The other two runway designations (Runway 2-20 and Runway 16-34) should also be maintained, as detailed in **Table 25**.

TABLE 25 | Runway Designations

Runway	True Heading	Magnetic Heading	Desired Runway ID
Runway 11-29	121/301	115/295	11/29
Runway 2-20	030/210	024/204	2/20
Runway 16-34	165/345	159/339	16/34
Magnetic Declination: 5° 53' E ± 0° 21' changing by 0° 7' W per year; rounded to 6°			

Sources: Airnav.com; NOAA

FAA Advisory Circular 150/5300-13B, *Airport Design*, recommends that a crosswind runway be made available when the primary runway orientation provides for less than 95 percent wind coverage for specific crosswind components. The 95 percent wind coverage is computed on the basis of not exceeding a 10.5-knot (12 mph) component for ARC A-I and B-I; 13-knot (15 mph) component for ARC A-II and B-II; 16-knot (18 mph) component for ARC A-III, B-III, C-I through C-III, and D-I through D-III; and a 20-knot (23) component for ARC A-IV through E-VI.

Exhibit 4, presented previously, details the associated wind coverage. As stated previously, in all weather conditions, Runway 11-29 provides for 77.51 percent coverage in 10.5-knot crosswind conditions, 87.44 percent coverage in 13-knot crosswind conditions, and greater than 95 percent coverage in 16-knot and higher crosswind conditions. As shown on the exhibit, the other two runways provide better crosswind coverage than Runway 11-29, and all three runways combined provide greater than 98 percent coverage in the 10.5-knot condition.

Based on this information, a crosswind runway at ODO is justified for federal funding assistance; however, a third runway is not. An additional runway is defined as a runway that is not the primary or crosswind, and the FAA will generally not participate in funding for maintenance for additional runways[22]. Such is the case with Runway 2-20 at ODO, which is funded by Ector County. As part of this study, an analysis of the necessity of maintaining an additional runway has been included. Each of the runways was examined in relation to one another to determine the combined crosswind coverage of a two-runway system. **Exhibit 26** details the results of this analysis for all weather and IFR conditions. Based on these findings, the preferred combination is Runway 11-29 and Runway 2-20, which offers a combined wind coverage of 96.37 percent in 10.5-knot crosswind conditions and greater than 99 percent coverage for 13-knot and higher conditions. Other considerations, such as local land uses and constraining factors, could influence which runway is best served as the crosswind as well. Alternatives in the next section will include options to maintain the three-runway system currently available or to decommission one of the runways.

RUNWAYS 11/29 & 2/20

ALL WEATHER WIND COVERAGE					IFR WIND COVERAGE				
Runways	10.5 Knots	13 Knots	16 Knots	20 Knots	Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 11-29	77.51%	87.44%	95.67%	98.94%	Runway 11-29	71.61%	81.90%	92.39%	97.43%
Runway 2-20	87.00%	93.43%	97.86%	99.44%	Runway 2-20	92.18%	95.87%	98.22%	99.24%
All Runways	96.37%	99.02%	99.82%	99.98%	All Runways	97.13%	98.98%	99.62%	99.92%

RUNWAYS 11/29 & 16/34

ALL WEATHER WIND COVERAGE					IFR WIND COVERAGE				
Runways	10.5 Knots	13 Knots	16 Knots	20 Knots	Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 11-29	77.51%	87.44%	95.67%	98.94%	Runway 11-29	71.61%	81.90%	92.39%	97.43%
Runway 16-34	86.87%	92.30%	97.06%	99.13%	Runway 16-34	78.84%	87.43%	95.26%	98.63%
All Runways	91.83%	96.18%	98.69%	99.79%	All Runways	83.63%	91.67%	96.88%	99.47%

RUNWAYS 16/34 & 2/20

ALL WEATHER WIND COVERAGE					IFR WIND COVERAGE				
Runways	10.5 Knots	13 Knots	16 Knots	20 Knots	Runways	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 16-34	86.87%	92.30%	97.06%	99.13%	Runway 16-34	78.84%	87.43%	95.26%	98.63%
Runway 2-20	87.00%	93.43%	97.86%	99.44%	Runway 2-20	92.18%	95.87%	98.22%	99.24%
All Runways	95.25%	97.85%	99.21%	99.76%	All Runways	95.77%	98.21%	99.17%	99.61%

Exhibit 26 – Dual Runway Wind Coverage

[22] FAA AIP Handbook, https://www.faa.gov/airports/aip/aip_handbook/?Chapter=Appendix#PG02

RUNWAY LENGTH REQUIREMENTS

AC 150/5325-4B, *Runway Length Requirements for Airport Design*, provides guidance for determining runway length needs. The determination of runway length requirements for the airport is based on five primary factors:

- Mean maximum temperature of hottest month
- Airport elevation
- Runway gradient
- Critical aircraft type expected to use the runway
- Stage length of the longest nonstop destination (specific to larger aircraft)

The mean maximum daily temperature of the hottest month for ODO is 95.3 degrees Fahrenheit (F), which occurs in July. The airport elevation is 3,004 feet mean sea level (MSL). The longest runway, Runway 11-29, has a gradient of 0.10 percent, which conforms to FAA design standards for gradient.

Airplanes operate on a wide variety of available runway lengths. Many factors will govern the sustainability of runway lengths for aircraft, such as elevation, temperature, wind, aircraft weight, wing flap settings, runway condition (wet or dry), runway gradient, vicinity airspace obstructions, and any special operating procedures. Airport operators can pursue policies that maximize the sustainability of the runway length. Policies such as area zoning and height and hazard restricting can protect an airport's runway length. Airport ownership (fee simple easement) of land leading to the runway ends reduces the possibility of natural growth or man-made obstructions. Planning of runways should include an evaluation of aircraft types expected to use the airport now and in the future. Future planning should be realistic and supported by the FAA-approved forecasts and should be based on the critical aircraft (or family of aircraft).

General Aviation Aircraft

Most operations occurring at ODO are conducted using smaller GA aircraft weighing less than 12,500 pounds. Following guidance from AC 150/ 5325-4B, to accommodate 95 percent of these small aircraft with less than 10 passenger seats, a runway length of 4,600 feet is recommended. For 100 percent of these small aircraft, a runway length of 5,000 feet is recommended. For small aircraft with 10 or more passenger seats, 5,000 feet of runway length is recommended.

The airport is also utilized by aircraft weighing more than 12,500 pounds, including small- to medium-sized business jet aircraft. Runway length requirements for business jets weighing less than 60,000 pounds have also been calculated. These calculations take into consideration the runway gradient and landing length requirements for contaminated runways (wet). Business jets tend to need greater runway length when landing on a wet surface because of their increased approach speeds. AC 150/5325-4B stipulates that runway length determination for business jets consider a grouping of airplanes with similar operating characteristics. The AC provides two separate "family groupings of airplanes," each based upon their representative percentage of aircraft in the national fleet. The first grouping is those business jets that make up 75 percent of the national fleet, and the second group is those making up 100 percent of the national fleet. **Table 26** presents a partial list of common aircraft in each aircraft grouping. A third group considers business jets weighing more than 60,000 pounds. Runway length determination for these aircraft must be based on the performance characteristics of the individual aircraft.

Table 26 | Business Jet Categories for Runway Length Determination

Aircraft	MTOW (lbs.)
75 Percent of the National Fleet	
Lear 35	20,350
Lear 45	20,500
Cessna 550	14,100
Cessna 560XL	20,000
Cessna 650 (VII)	22,000
IAI Westwind	23,500
Beechjet 400	15,800
Falcon 50	18,500
75-100 Percent of the National Fleet	
Lear 55	21,500
Lear 60	23,500
Hawker 800XP	28,000
Hawker 1000	31,000
Cessna 650 (III/IV)	22,000
Cessna 750 (X)	36,100
Challenger 604	47,600
IAI Astra	23,500
Greater than 60,000 Pounds	
Gulfstream II	65,500
Gulfstream IV	73,200
Gulfstream V	90,500
Global Express	98,000
Gulfstream 650	99,600
MTOW: Maximum Takeoff Weight	

Source: FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*

Table 27 presents the results of the runway length analysis for business jets developed following the guidance provided in AC 150/5325-4B. To accommodate 75 percent of the business jet fleet at 60 percent useful load, a runway length of 5,800 feet is recommended. This length is derived from a raw length of 5,727 feet that is adjusted, as recommended, for runway gradient and consideration of landing length needs on a contaminated runway (wet and slippery). To accommodate 100 percent of the business jet fleet at 60 percent useful load, a runway length of 7,600 feet is recommended.

Table 27 | Runway Length Requirements

Fleet Mix Category	TAKEOFF LENGTHS		LANDING LENGTHS	Final Runway Length
	Raw Runway Length from FAA AC	Runway Length with Gradient Adjustment (+360')	Wet Surface Landing Length for Jets (+15%)*	
75% of fleet at 60% useful load	5,727	5,787	5,500	5,800
100% of fleet at 60% useful load	7,475	7,535	5,500	7,600
75% of fleet at 90% useful load	8,606	8,666	7,000	8,700
100% of fleet at 90% useful load	8,606	8,666	7,000	8,700
*Max 5,500' for 60% useful load and max 7,000' for 90% useful load in wet condition.				

Source: FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*

Utilization of the 90 percent category for runway length determination is generally not considered by the FAA unless there is a demonstrated need at an airport. This could be documented activity by a business jet operator that flies out frequently with heavy loads. To accommodate 75 percent of the business jet fleet at 90 percent useful load, a runway length of 8,700 feet is recommended. To accommodate 100 percent of business jets at 90 percent useful load, a runway length of 8,700 feet is recommended.

Another method to determine runway length requirements for aircraft at ODO is to examine aircraft flight planning manuals under conditions specific to the airport. Several aircraft were analyzed for take-off length requirements at a design temperature of 95.3 degrees F at a field elevation of 3,004 feet MSL with a 0.10 percent runway grade. **Table 28** provides a detailed runway length analysis for several of the most common turbine aircraft in the national fleet. This data was obtained from Ultranav software, which computes operational parameters for specific aircraft based on flight manual data. The analysis includes the maximum takeoff weight (MTOW) allowable and the percent useful load from 60 percent to 100 percent.

TABLE 28 - Business Aircraft Takeoff Length Requirements

		TAKEOFF LENGTH REQUIREMENTS (FEET)				
		Useful Load				
Aircraft Name	MTOW	60%	70%	80%	90%	100%
Pilatus PC-12	9,921	2,521	2,741	2,973	3,217	3,473
King Air C90GTi	10,100	3,000	3,221	3,466	3,710	3,954
King Air 200 GT	12,500	4,099	4,238	4,362	4,475	4,581
Citation CJ3	13,870	3,412	3,678	3,974	4,334	4,735
Citation Sovereign	30,300	3,581	3,844	4,114	4,425	4,789
King Air 350	15,000	4,239	4,406	4,576	4,909	5,282
Gulfstream 450	74,600	5,321	5,874	6,485	7,128	7,872
Lear 40	21,000	5,186	5,811	6,538	7,318	8,113
Falcon 2000	35,800	5,548	6,029	6,557	7,212	8,610
Challenger 604/605	48,200	5,893	6,492	7,193	7,956	8,740
Gulfstream 650	99,600	5,663	6,280	6,960	7,826	8,789
Gulfstream 550	91,000	5,647	6,319	7,272	8,263	9,234
Beechjet 400A	16,300	4,752	5,130	5,508	Climb Limited	Climb Limited
Citation II (550)	13,300	3,745	4,179	4,650	5,159	Climb Limited
Citation 560 XLS	20,200	4,016	4,337	4,687	5,063	Climb Limited
Citation X	35,700	5,324	5,853	6,438	Climb Limited	Climb Limited
Citation III	21,500	5,067	5,601	Climb Limited	Climb Limited	Climb Limited
Citation (525) CJ1	10,600	4,228	4,681	5,141	Climb Limited	Climb Limited
Citation (525A) CJ2	12,375	3,723	4,024	4,351	4,708	Climb Limited
Lear 60	23,500	6,263	6,854	7,521	8,425	Climb Limited

Green figures are less than or equal to the longest runway length available at ODO; orange figures are greater than that length (6,200')
'Climb Limited' indicates the input data is outside the operating limits of the aircraft planning manual.
MTOW - Maximum Takeoff Weight

Source: Ultranav software

The analysis shows that the current length of 6,200 feet available on Runway 11-29 is adequate for all but one of the business jets analyzed at 60 percent useful load. At 70 percent useful load, three more aircraft are limited, and progressively more jets become weight-restricted at 80 percent and greater useful loads, with many not capable due to climb limitations at 100 percent useful loads.

Table 29 presents the runway length required for landing under three operational categories: Title 14 Code of Federal Regulations (CFR) Part 25, CFR Part 135, and CFR Part 91k. CFR Part 25 operations are those conducted by individuals or companies which own their aircraft. CFR Part 135 applies to all for-hire charter operations, including most fractional ownership operations. CFR Part 91k includes operations in fractional ownership which utilize their own aircraft under direction of pilots specifically assigned to said aircraft. Part 91k and Part 135 rules regarding landing operations require operators to land at the destination airport within 60 percent of the effective runway length. An additional rule allows for operators to land within 80 percent of the effective runway length if the operator has an approved destination airport analysis in the airport's program operating manual. The landing length analysis conducted accounts for both scenarios.

Table 29 | Turbine Aircraft Landing Length Requirements

Aircraft Name	MLW	LANDING LENGTH REQUIREMENTS (FEET)					
		Dry Runway Condition			Wet Runway Condition		
		Part 25	80% Rule	60% Rule	Part 25	80% Rule	60% Rule
King Air 350	15,000	2,974	3,718	4,957	3,420	4,275	5,700
Falcon 2000	33,000	3,325	4,156	5,542	3,824	4,780	6,373
Citation Sovereign	27,100	2,989	3,736	4,982	3,833	4,791	6,388
Lear 40	19,200	3,079	3,849	5,132	3,967	4,959	6,612
Citation (525) CJ1	9,800	3,104	3,880	5,173	4,205	5,256	7,008
Citation CJ3	12,750	3,191	3,989	5,318	4,338	5,423	7,230
Citation III	19,000	3,208	4,010	5,347	4,559	5,699	7,598
Challenger 604/605	38,000	3,017	3,771	5,028	4,781	5,976	7,968
Citation (525A) CJ2	11,500	3,362	4,203	5,603	4,852	6,065	8,087
Gulfstream 550	75,300	2,958	3,698	4,930	5,400	6,750	9,000
Gulfstream 650	83,500	4,130	5,163	6,883	5,503	6,879	9,172
Citation 560 XLS	18,700	3,632	4,540	6,053	5,770	7,213	9,617
Citation X	31,800	4,109	5,136	6,848	5,851	7,314	9,752
Gulfstream 450	66,000	3,472	4,340	5,787	6,063	7,579	10,105
Beechjet 400A	15,700	No Data	No Data	No Data	No Data	No Data	No Data
King Air C90GTi	9,600	1,653	2,066	2,755	No Data	No Data	No Data
Citation II (550)	12,700	2,783	3,479	4,638	No Data	No Data	No Data
King Air 200 GT	12,500	1,330	1,663	2,217	No Data	No Data	No Data
Pilatus PC-12	9,921	2,483	3,104	4,138	No Data	No Data	No Data

Green figures are less than or equal to the longest runway length available at ODO; orange figures are greater than that length (6,200')
MLW – Maximum Landing Weight
N/A – Not Applicable. Turboprop aircraft landing lengths are not adjusted for wet runway conditions.
Source: Ultranav software

The landing length analysis shows that all Part 25 and Part 91k operations, as well as most aircraft operating under Part 135, can land on the available runway length at ODO during dry runway conditions. During wet or contaminated runway conditions, Part 25 operations can land on Runway 11-29; however, fewer aircraft are able to meet the landing length requirements under Part 91k and Part 135.

Runway Length Summary

Many factors are considered when determining appropriate runway length for safe and efficient operations of aircraft at ODO. The airport should strive to accommodate business jets and turboprop aircraft to the greatest extent possible as demand would dictate. Runway 11-29 is the longest runway available at 6,200 feet, and it can accommodate many of these aircraft under moderate loading conditions, even during hot temperatures and at high percentage useful loads. At near maximum takeoff weights (MTOWs), some aircraft do have runway length requirements that exceed the available length on Runway 11-29, and many are climb limited.

Justification for any runway extension to meet the needs of turbine aircraft would require regular use on the order of 500 annual itinerant operations. This is the minimum threshold required to obtain FAA grant funding assistance. The existing critical aircraft, the King Air 200/300/350, can operate at 100 percent useful load. The ultimate critical aircraft, the G650, requires a longer runway than what is currently available when operating at 70 percent and greater useful loads. While the majority of the business jets analyzed can operate on the existing runway length with up to 80 percent useful loads, it is important to plan for the eventuality of larger C/D aircraft operating more frequently at ODO. As such, alternatives in the next section will evaluate options for extending Runway 11-29 up to 7,000 feet.

RUNWAY WIDTH

Runway width design standards are based primarily on the airport's critical aircraft but can also be influenced by the visibility minimums of published instrument approach procedures. At 100 feet wide, Runway 11-29 exceeds B-II-4000 design standards which call for a runway width of 75 feet. However, in the ultimate condition of C-III-2400, the standard runway width increases to 100 feet. As such, Runway 11-29 should be maintained at 100 feet wide if it is selected as the primary runway to meet ultimate C-III design standards. Runways 2-20 and 16-34 are both 75 feet wide, which meets the existing and ultimate design standards for these runways unless one is selected for primary runway status.

RUNWAY PAVEMENT STRENGTH

Airport pavements must be able to withstand repeated operations by aircraft of significant weight; therefore, the strength rating of a runway is an important consideration in facility planning. While runways are assigned a specific strength rating, it does not preclude aircraft weighing more than the published strength rating from using the runway. All federally obligated airports must remain open to the public, and it is typically up to the pilot of the aircraft to determine if a runway can support their aircraft safely. An airport sponsor cannot restrict an aircraft from using the runway simply because its weight exceeds the published strength rating. On the other hand, the airport sponsor has an obligation to properly maintain the runway and protect the useful life of the runway, typically for 20 years. According to the FAA publication, *Airport/Facility Directory*, "Runway strength rating is not intended as a maximum allowable weight or as an operating limitation. Many airport pavements are capable of supporting limited operations with gross weights in excess of the published figures." The directory goes on to say that those aircraft exceeding the pavement strength should contact the airport sponsor for permission to operate at the airport.

The current runway strength rating on Runway 11-29 is reported at 30,000 pounds SWL, which is adequate to accommodate the majority of aircraft that currently operate at the airport. However, as detailed in the TFMSC (see **Exhibit 24**), the airport is also used by larger, heavier aircraft that have MTOWs of greater than 30,000 pounds. For example, the Challenger 600/604, a C-II aircraft, has an MTOW of 48,200 pounds with dual-wheel main landing gear, while the ultimate critical aircraft (G650) has an MTOW of 99,600 pounds DWL. Therefore, strengthening the primary runway to 100,000 pounds DWL by the long-term to better accommodate these heavier aircraft should be considered.

Runways 2-20 and 16-34 both have reported pavement strengths of 14,000 pounds SWL. The King Air 350, which has been identified as the existing and ultimate critical aircraft for these runways, has an MTOW of 15,000 pounds on dual-wheel main landing gear. Consideration should also be given to increasing the pavement strength on one or both of these runways to 30,000 pounds DWL to accommodate a wider range of B-II aircraft.

SEPARATION STANDARDS

Runway/Taxiway Separation

The design standard for the separation between runways and parallel taxiways is a function of the critical aircraft and the instrument approach visibility minimum. The separation standard for Runway 11-29 in the existing condition is 240 feet from the runway centerline to the parallel taxiway centerline and 400 feet centerline to centerline in the ultimate C-III-2400 condition. Partial parallel Taxiway G is 400 feet southwest of Runway 11-29, which meets the ultimate design standard and should be maintained throughout the planning period.

The separation standard for taxiways serving Runways 2-20 and 16-34 is 240 feet, centerline to centerline. Taxiway D, where it extends parallel to Runway 2-20, has a separation of 300 feet, as does Taxiway G where it is parallel to Runway 16-34. This additional separation above the standard 240 feet provides an additional safety margin for pilots and aircraft, and these taxiways should be maintained in their existing locations.

Holding Position Separation

Holding position markings are placed on taxiways leading to runways. When approaching the runway, pilots should stop short of the holding position marking line. FAA design standards call for hold lines to be 200 feet from runway centerline for B-II runways with approach minimums no lower than ¾-mile, and 250 feet from runway centerline for C-III runways with approach minimums lower than ¾-mile. The FAA also recommends that hold lines be parallel with the runway so that a pilot is fully perpendicular to the runway with a clear, unobstructed view of the entire runway length. If a 90-degree angle intersection with the runway is not practicable, a +/- 15-degree margin is allowable.

At ODO, all hold lines leading to Runway 11-29 are 250 feet from the runway centerline and are perpendicular to the runway, meeting FAA standards for the ultimate condition. Hold lines serving Runway 2-20 are at least 200 feet from the runway centerline and are perpendicular, with the exception of the markings on Taxiway G where it crosses Runway 2-20. These holding position markings are approximately 300 feet from the centerline and are outside the allowable margin for intersection angles. Similarly, taxiways leading to Runway 16-34 are marked with hold lines that meet the separation standard of 200 feet and are positioned 90 degrees from the runway centerline, except for those on Taxiway C. These markings are located approximately 280 feet from centerline but fall outside the allowable +/- 15-degree margin. The next section, Alternatives, will consider various options to correct the nonstandard conditions on Taxiways G and C.

Aircraft Parking Area Separation

According to FAA AC 150/5300-13B, aircraft parking positions should be located to ensure that aircraft components (wings, tail, and fuselage) do not:

1. Conflict with the object free area for adjacent runway or taxiways:
   a. Runway Object Free Area (ROFA)
   b. Taxiway Object Free Area (TOFA)
   c. Taxilane Object Free Area (TLOFA)

2. Violate any of the following aeronautical surfaces and areas:
   a. Runway approach or departure surface
   b. Runway Visibility Zone (RVZ)
   c. Runway Obstacle Free Zone (ROFZ)
   d. Navigational aid equipment critical areas

Marked aircraft parking positions at ODO are located on the north ramp, the south ramp, and the south T-hangar ramp. Aircraft parking also occurs on the FBO/terminal ramp, though there are no marked positions. **Exhibit 27** depicts these areas, along with the existing ROFA, TOFA, and TLOFA (TOFA and TLOFA standards are described in greater detail in the next section). While marked parking is not included on the FBO/terminal ramp, any aircraft parked within the orange or purple shaded areas would become obstructions, and any future pavement markings. On the north ramp, the pavement has deteriorated and several of the marked parking areas are no longer visible; those that are visible are clear of the TOFA and TLOFA. The south ramp and south T-hangar ramp do contain marked aircraft parking positions that are located within either the TOFA or the TLOFA. In the ultimate C-III condition, the TOFA for taxiways serving the runway, which includes Taxiway A that runs along the south ramp, increases in

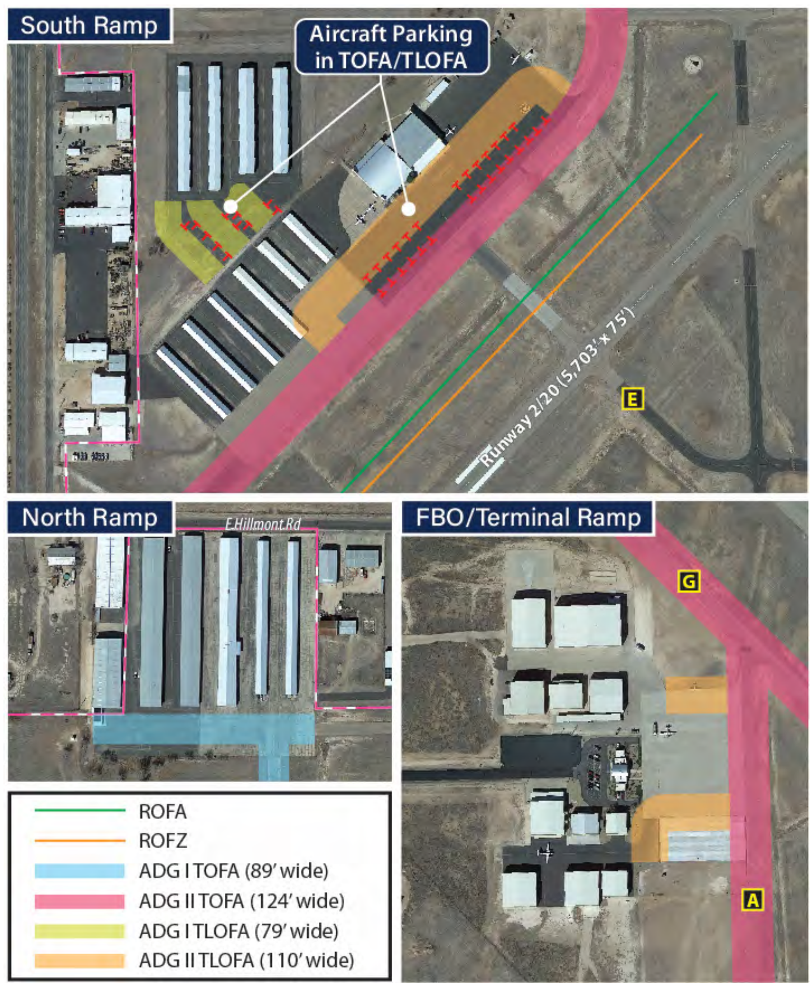


Exhibit 27 – Aircraft Parking Separation

width, and will encompass a larger area. Marked aircraft parking positions, which are indicated in red on the exhibit, should be removed/relocated so that parked aircraft do not obstruct these safety areas. Additionally, a portion of a T-hangar located on the south ramp is located within the TLOF, and the taxilane centerline marking should be relocated so that this safety area is not obstructed by the hangar.

TAXIWAYS

The design standards associated with taxiways are determined by the Taxiway Design Group (TDG) or the ADG of the critical design aircraft. As determined previously, the applicable ADG for all runways at ODO is ADG II at present, with an anticipated shift to ADG III in the ultimate condition. **Table 30** presents the various taxiway design standards related to ADG II and III. The table also shows those taxiway design standards related to TDG. The TDG standards are based on the Main Gear Width (MGW) and Cockpit to Main Gear (CMG) distance of the critical design aircraft expected to use those taxiways. Different taxiway and taxilane pavements can and should be planned to the most appropriate TDG design standards based on usage.

Table 30 | Taxiway Dimensions and Standards

STANDARDS BASED ON WINGSPAN	*ADG II*	*ADG III*
Taxiway and Taxilane Protection		
Taxiway Safety Area width (TSA)	79'	118'
Taxiway Object Free Area width (TOFA)	124'	171'
Taxilane Object Free Area width (TLOFA)	110'	158'
Taxiway and Taxilane Separation		
Taxiway Centerline to Parallel Taxiway Centerline	102'	144'
Taxiway Centerline to Fixed or Moveable Object	62'	85.5'
Taxilane Centerline to Parallel Taxilane Centerline	94'	138'
Taxilane Centerline to Fixed or Moveable Object	55'	79'
Wingtip Clearance		
Taxiway Wingtip Clearance (feet)	23'	27'
Taxilane Wingtip Clearance (feet)	16'	20'
STANDARDS BASED ON TDG	*TDG 1A/1B*	*TDG 2*
Taxiway Width Standard	25'	35'
Taxiway Edge Safety Margin	5'	7.5'
Taxiway Shoulder Width	10'	15'
ADG: Airplane Design Group | TDG: Taxiway Design Group | Note: All dimensions in feet		

Source: FAA AC 150/5300-13B, *Airport Design*

The current design for taxiways serving all runways is TDG 2, based upon the Beechcraft King Air 200/300/350, which dictates a width of 35 feet. The entire taxiway system at ODO is at least 35 feet wide. Certain portions of the landside area that are utilized exclusively by small aircraft, such as the T-hangar areas, should adhere to TDG 1A/1B standards.

All taxiway widths on the airfield should at least be maintained unless financial constraints dictate. As such, the width could remain until such time as rehabilitation is needed and financial resources to support such are not available. FAA grant availability can only be provided if the project meets eligibility thresholds as determined by the FAA.

At ODO, the existing taxiway object free area (TOFA) for taxiways serving each of the runways is 124 feet wide, with an increase to 171' feet wide when the airport transitions to C-III. The taxilane object free area (TLOFA) for taxilanes serving executive and conventional hangar areas is 110 feet wide and 79 feet wide for taxilanes serving T-hangars. Both the TOFA and the TLOFA should be cleared of objects except for those needed for air navigation or aircraft ground maneuvering purposes. The TOFAs associated with the airfield taxiways are clear of obstructions; however, as mentioned previously, several of the aircraft parking positions on the south ramp and south T-hangar ramp are located within a TOFA or TLOFA.

Taxiway and Taxilane Design Considerations

FAA AC 150/5300-13B, *Airport Design*, provides guidance on recommended taxiway and taxilane layouts to enhance safety by avoiding runway incursions. A runway incursion is defined as "any occurrence at an airport involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft." The following is a list of the taxiway design guidelines and the basic rationale behind each recommendation included in the current AC, as well as previous FAA safety and design recommendations.

1. **Taxiing Method**: Taxiways are designed for "cockpit over centerline" taxiing with pavement being sufficiently wide to allow a certain amount of wander. On turns, sufficient pavement should be provided to maintain the edge safety margin from the landing gear. When constructing new taxiways, upgrading existing intersections should be undertaken to eliminate "judgmental oversteering," which is where the pilot must intentionally steer the cockpit outside the marked centerline in order to assure the aircraft remains on the taxiway pavement.
2. **Curve Design**: Taxiways should be designed such that the nose gear steering angle is no more than 50 degrees, the generally accepted value to prevent excessive tire scrubbing.
3. **Three-Path Concept**: To maintain pilot situational awareness, taxiway intersections should provide a pilot a maximum of three choices of travel. Ideally, these are right, left, and a continuation straight ahead.
4. **Channelized Taxiing**: To support visibility of airfield signage, taxiway intersections should be designed to meet standard taxiway width and fillet geometry.
5. **Designated Hot Spots and Runway Incursion Mitigation (RIM) Locations**: A hot spot is a location on the airfield with elevated risk of a collision or runway incursion. For areas the FAA designates as a hot spot or RIM location, mitigation measures should be prioritized.
6. **Intersection Angles**: Design turns to be 90 degrees wherever possible. For acute-angle intersections, standard angles of 30, 45, 60, 120, 135, and 150 degrees are preferred.
7. **Runway Incursions**: Design taxiways to reduce the probability of runway incursions.
    - *Increase Pilot Situational Awareness*: A pilot who knows where he/she is on the airport is less likely to enter a runway improperly. Complexity leads to confusion. Keep taxiway systems simple using the "three-path" concept.
    - *Avoid Wide Expanses of Pavement*: Wide pavements require placement of signs far from a pilot's eye. This is especially critical at runway entrance points. Where a wide expanse of pavement is necessary, avoid direct access to a runway.

- *Limit Runway Crossings*: The taxiway layout can reduce the opportunity for human error. The benefits are twofold – through simple reduction in the number of occurrences, and through a reduction in air traffic controller workload.
- *Avoid "High Energy" Intersections*: These are intersections in the middle third of runways. By limiting runway crossings to the first and last thirds of the runway, the portion of the runway where a pilot can least maneuver to avoid a collision is kept clear.
- *Increase Visibility*: Right-angle intersections, both between taxiways and runways, provide the best visibility. Acute-angle runway exits provide greater efficiency in runway usage but should not be used as runway entrance or crossing points. A right-angle turn at the end of a parallel taxiway is a clear indication of approaching a runway.
- *Avoid "Dual Purpose" Pavements*: Runways used as taxiways and taxiways used as runways can lead to confusion. A runway should always be clearly identified as a runway and only a runway.
- *Direct Access*: Do not design taxiways to lead directly from an apron to a runway. Such configurations can lead to confusion when a pilot typically expects to encounter a parallel taxiway.
- *Hot Spots*: Confusing intersections near runways are more likely to contribute to runway incursions. These intersections must be redesigned when the associated runway is subject to reconstruction or rehabilitation. Other hot spots should be corrected as soon as practicable.

8. **Runway/Taxiway Intersections**
   - *Right Angle*: Right-angle intersections are the standard for all runway/taxiway intersections, except where there is a need for an acute-angled exit. Right-angle taxiways provide the best visual perspective to a pilot approaching an intersection with the runway to observe aircraft in both the left and right directions. They also provide optimal orientation of the runway holding position signs, so they are visible to pilots.
   - *Acute Angle*: Acute angles should not be larger than 45 degrees from the runway centerline. A 30-degree taxiway layout should be reserved for high-speed exits. The use of multiple intersecting taxiways with acute angles creates pilot confusion and improper positioning of taxiway signage. The construction of high-speed exits is typically only justified for runways with regular use by jet aircraft in approach categories C and above.
   - *Large Expanses of Pavement*: Taxiways must never coincide with the intersection of two runways. Taxiway configurations with multiple taxiway and runway intersections in a single area create large expanses of pavement, making it difficult to provide proper signage, marking, and lighting.

9. **Taxiway/Runway/Apron Incursion Prevention**: Apron locations that allow direct access into a runway should be avoided. Increase pilot situational awareness by designing taxiways in such a manner that forces pilots to consciously make turns. Taxiways originating from aprons and forming a straight line across runways at mid-span should be avoided.
   - *Wide Throat Taxiways*: Wide throat taxiway entrances should be avoided. Such large expanses of pavement may cause pilot confusion and make lighting and marking more difficult.
   - *Direct Access from Apron to a Runway*: Avoid taxiway connectors that cross over a parallel taxiway and directly onto a runway. Consider a staggered taxiway layout or no-taxi island that forces pilots to make a conscious decision to turn.
   - *Apron to Parallel Taxiway End*: Avoid direct connection from an apron to a parallel taxiway at the end of a runway.

The taxiway system at ODO generally provides for the efficient movement of aircraft, and there are no FAA-designated hot spots at the airport. However, there are several non-standard taxiway geometry conditions, as detailed on **Exhibit 28**, including:

- Taxiway E provides direct access to Runway 2-20 from the south ramp.
- Taxiway D crosses Runways 11-29 and 16-34 in their high-energy areas, as does Taxiway G where it crosses Runway 2-20.
- Taxiway G has an acute-angled intersection with Runway 2-20, and Taxiway C with Runway 16-34. These intersections are outside the +/- 15-degree margin discussed previously.
- The holding bays serving each runway end are non-standard. The FAA now considers these designs to be wide expanses of pavement and has set new standards for holding bay design.
- Taxiway fillet geometry is non-standard. Taxiway fillets are areas of additional pavement designed to maintain the taxiway edge safety margin (TESM) and serve to widen taxiways at the inside of turns. This increases the safety margin for taxiing aircraft when pilots are navigating turns.

In the alternatives chapter, potential solutions to these non-standard conditions will be presented. Analysis in the next chapter will also consider improvements which could be implemented on the airfield to minimize runway incursion potential, improve efficiency, and conform to FAA standards for taxiway design.

NAVIGATIONAL AND APPROACH AIDS

Navigational aids are devices that provide pilots with guidance and position information when utilizing the runway system. Electronic and visual guidance to arriving aircraft enhance the safety and capacity of the airfield. Such facilities are vital to the success of an airport and provide additional safety to pilots and passengers using the air transportation system. While instrument approach aids are especially helpful during poor weather, they are often used by pilots conducting flight training and operating larger aircraft when visibility is good.

Instrument Approach Aids

ODO has three published instrument approach procedures and a circling VOR-A approach. Runway 11-29 has non-precision LPV (GPS) approaches to both ends that provide visibility minimums down to ¾-mile. Analysis in the next chapter will consider improvements necessary for enhancing instrument approach capabilities to Runway 29 (i.e., visibility minimums down to ½-mile). In support of the ¾-mile LPV approach, both ends of Runway 11-29 are equipped with a medium intensity approach lighting system (MALS) that enhances safety at the airport, especially during inclement weather or nighttime activity. In order to achieve a ½-mile LPV approach to Runway 29, the existing MALS equipment would need to be upgraded to a MALSR, which includes runway alignment indicator lights. A lower approach minimum is not being considered to Runway 11, as this would increase the size of the RPZ and introduce more incompatible land uses, including homes and businesses.

NONSTANDARD TAXIWAY CONDITIONS

Runway 20 offers an LNAV (GPS) approach with visibility minimums down to one mile. This approach should be maintained over the planning period. An instrument approach to Runway 2 is unlikely to be granted due to nearby surrounding land uses, which includes homes and businesses.

Runway 16-34 is a visual runway with no instrument approach capability. Instrument approach procedures will be considered only if the runway were to remain operational, which will be analyzed in the Alternatives section.

Visual Approach Aids

In most instances, the landing phase of any flight must be conducted in visual conditions. To provide pilots with visual guidance information during landings to the runway, electronic visual approach aids are commonly provided at airports. All runway ends at ODO are equipped with visual approach aids that provide pilots with an indication of being above, below, or on the correct descent glidepath. These systems include PAPI-4s on Runway 11-29, PAPI-2s on Runway 16-34, and VASIs on Runway 2-20. The PAPI-4s on each end of Runway 11-29 should be maintained throughout the planning period, and the crosswind runway should be equipped with PAPI-2s. If an additional runway is maintained, it should also be equipped with PAPI-2s.

Runway end identification lights (REILs) are flashing lights located at the runway threshold that facilitate rapid identification of the runway end at night and during poor visibility conditions. REILs provide pilots with the ability to identify the runway threshold and distinguish runway end lighting from other lighting on the airport and in the approach areas. None of the runways are equipped with REILs. Consideration should be given to installing REILs on both ends of the ultimate crosswind runway and the additional runway if it is maintained in the future. As Runway 11-29 is equipped with a more sophisticated MALS on both ends, REILs are not necessary.

As mentioned, a medium-intensity approach lighting system (MALSR) is recommended for a ½-mile LPV (GPS) approach. MALSRs consist of a combination of steady burning light bars and flashers that provide pilots with visual information on runway alignment, height perception, roll guidance, and horizontal references to support the visual portion of an instrument approach. The Alternatives section will depict options for installing the additional components necessary to complete a MALSR on Runway 29.

Airfield Marking, Lighting, and Signage

All three runways have non-precision markings, which is consistent with the available instrument approach capabilities of the runway system. If and when the airport is provided with visibility minimums lower than ¾-mile, the runway end offering the improved approach would need to be equipped with precision markings with the addition of touchdown zone markings. Current runway markings should be maintained until such time that a ½-mile approach is implemented.

Runway and taxiway lighting systems serve as a primary means of navigation in reduced visibility and nighttime operations. Currently, all runways are equipped with MIRL, a common runway lighting system that can be activated via a pilot-controlled system. This system should be maintained through the planning period. The taxiways are equipped with green taxiway centerline reflectors. Consideration should be given to upgrading to medium intensity taxiway lighting (MITL) on all taxiways.

Airfield signage serves as another means of navigation for pilots. Airfield signage informs pilots of their location on the airport, as well as directs them to major airport facilities, such as runways, taxiways, and aprons. Lighted location and directional signs are installed on the airfield. This system is adequate and should be maintained through the planning period.

Weather Facilities

ODO is equipped with a lighted wind cone and segmented circle located near the intersection of Runway 11-29 and Taxiway D. The wind cone provides pilots with information about wind conditions, while the segmented circle provides traffic pattern information to pilots. Supplemental wind cones are located at the ends of Runways 2, 20, 16, and 34 and on top of a T-hangar on the south ramp. As mentioned previously, the wind cones situated near the runway ends are located inside the ROFA/ROFZ in the existing and ultimate conditions and should be relocated outside these safety areas.

The airfield is also equipped with an ASOS, located between the Runway 16 and 20 ends. The ASOS transmits on-site weather condition information to pilots and should be maintained in its existing location throughout the planning horizon.

Airside facility requirements are summarized on **Exhibit 29**.

LANDSIDE FACILITY REQUIREMENTS

Elements included within this section include general aviation terminal facilities, aircraft hangars and tiedowns, aircraft parking aprons, automobile parking, and airport support facilities.

TERMINAL BUILDING REQUIREMENTS

The terminal facilities provide space for a variety of activities and pilot services. Existing GA terminal facilities at ODO are contained in a 4,100-square-foot (sf) building, which houses a lobby, pilots' lounge and snooze room, flight planning room, conference room, offices, kitchen, and restrooms.

The number of itinerant passengers expected to use terminal services during the design hour are taken into consideration to estimate terminal facility needs. These requirements are based upon a range of designated square feet per design hour passenger, which is typically between 90 and 125 sf. For this study, a planning standard of 100 sf was used to estimate the space required. To determine the number of design hour passengers, the number of itinerant design hour operations is multiplied by the number of passengers expected on the aircraft. Design hour itinerant operations have been estimated at 15

EXISTING	SHORT-TERM	LONG-TERM
Runway 11-29		
B-II-4000	C-III-2400	C-III-2400
6,200' x 100'	6,500' x 100'	7,000' x 100'
30,000 lbs SWL	Increase to 50,000 lbs DWL	Increase to 100,000 lbs DWL
Standard RSA, ROFA, ROFZ	Maintain	Maintain
Portions of both RPZs uncontrolled and contain incompatibilities	Acquire avigation easements; consider corrective measures for incompatibilites	Maintain corrected condition
Runway 2-20 (Preferred Crosswind)		
B-II-5000	B-II-5000	B-II-5000
5,703' x 75'	Maintain	Maintain
14,000 lbs SWL	Increase to 30,000 lbs DWL	Maintain
Standard RSA; wind cones in ROFA/ROFZ	Maintain RSA; relocate wind cones	Maintain corrected condition
Portions of both RPZs uncontrolled and contain incompatibilities	Acquire avigation easements; consider corrective measures for incompatibilites	Maintain corrected condition
Runway 16-34 (Potential Additional Runway)		
B-II-VIS	Consider runway closure	N/A
5,003' x 75'	N/A	N/A
14,000 lbs SWL	N/A	N/A
Standard RSA; wind cones in ROFA/ROFZ	Remove wind cones	N/A
Portions of both RPZs uncontrolled and contain incompatibilities	N/A	N/A
Taxiways		
All taxiways at least 35' wide, meeting TDG 2 standards	Maintain	Maintain
Standard runway/taxiway separation	Maintain	Maintain
TOFA/TLOFA obstructions on the south ramp and south T-hangar ramp	Consider corrective measures	Maintain corrected condition
Direct access from south ramp to Runway 2-20 via Taxiway E	Consider corrective measures	Maintain corrected condition
High-energy crossings	Consider corrective measures	Maintain corrected condition
Acute-angled runway/taxiway intersections	Consider corrective measures	Maintain corrected condition
Non-standard holding bays on each runway end	Consider corrective measures	Maintain corrected condition
Non-standard taxiway fillet geometry	Consider corrective measures	Maintain corrected condition
Navigational and Approach Aids		
LPV GPS (11, 29), RNAV GPS (20), circling VOR	Consider lower minimums on Runway 29	Maintain
MALS (11, 29)	Maintain MALS on 11; install MALSR on 29	Maintain
PAPI-4 (11, 29); VASI (2, 20); PAPI-2 (16, 34)	Maintain PAPI-4 on 11-29; replace VASIs on 2-20 with PAPI-2; add REILs to 2-20	Maintain
Lighting, Marking, Signage, and Weather Facilities		
Rotating beacon	Maintain	Maintain
MIRL	Maintain	Maintain
Taxiway Reflectors	Install MITL	Maintain
Non-precision markings	Precision markings on Runway 29; maintain other markings	Maintain
Standard holding position markings except on acute-angled taxiways	Maintain standard hold lines; include standard hold lines on new taxiway pavement	Maintain
Lighted airfield and directional signage	Maintain	Maintain
ASOS	Maintain in existing location	Maintain
Lighted wind cone and segemented circle; supplemental wind cones	Relocate supplemental wind cones located in ROFA/ROFZ	Maintain corrected condition

KEY

ASOS - Automatic Surface Observing System
GPS - Global Positioning System
LPV - Localizer Performance Vertical Guidance
MALSR - Medium Intensity Approach Lighting System with Runway Alignment
MIRL - Medium Intensity Runway Lighting
MITL - Medium Intensity Taxiway Lighting
PAPI - Precision Approach Path Indicator
REILs - Runway End Identifier Lights
RNAV - Area Navigation
ROFA - Runway Object Free Area
ROFZ - Runway Obstacle Free Zone
RPZ - Runway Protection Zone
RSA - Runway Safety Area
SWL - Single Wheel Landing Gear Type
TDG - Taxiway Design Group
TLOFA - Taxilane Object Free Area
TOFA - Taxiway Object Free Area
VASI - Visual Approach Slope Indicator
VIS - Visual
VOR - Very High Frequency Omni-Directional Range

percent of the design day itinerant operations occurring at the airport. As most of the aircraft operating at the airport allow for multiple passengers, a multiplier of 3.0 was established for the short-term, growing to 5.0 by the long-term. This is a reasonable multiplier as the airport regularly accommodates itinerant operations, including air taxi, by aircraft with seating capacities of four to 10 passengers – a trend which is expected to continue throughout the planning period.

Table 31 details current and projected terminal building requirements over the planning period. As can be seen, in terms of size, the existing terminal facility is adequate to accommodate airport users at present, though there may be perceived space constraints during busy times. By the end of the short-term planning horizon, an additional 300 sf of space may be required, and by the end of the long-term, the building needs will have doubled.

TABLE 31 | GA Terminal Services Requirements

	Available	Short Term	Intermediate Term	Long Term
Design Hour Itinerant Operations	13	15	16	18
Multiplier		3.0	3.5	5.0
Design Hour Itinerant Passengers		44	55	89
Total Building Space (sf)	**4,100**	**4,400**	**5,500**	**8,900**

Source: Coffman Associates analysis

AIRCRAFT STORAGE HANGARS, APRON, AND VEHICLE PARKING REQUIREMENTS

Utilization of hangar space varies as a function of local climate, security, and owner preferences. The trend in general aviation aircraft, whether single or multi-engine, is toward more sophisticated aircraft (and, consequently, more expensive aircraft); therefore, many aircraft owners prefer enclosed hangar space to outside tiedowns.

The demand for aircraft storage hangars is dependent upon the number and type of aircraft expected to be based at the airport in the future. For planning purposes, it is necessary to estimate hangar requirements based upon forecast operational activity. However, actual hangar construction should be based upon actual demand trends and financial investment conditions.

There are a variety of aircraft storage options typically available at an airport, including shade hangars, T-hangars, linear box hangars, executive/box hangars, and bulk storage conventional hangars. Shade hangars are the most basic form of aircraft protection and are common in warmer climates. These structures provide a roof covering, but no walls or doors.

T-hangars are intended to accommodate one small single engine piston aircraft or, in some cases, one multi-engine piston aircraft. T-hangars are so named because they are in the shape of a "T," providing a space for the aircraft nose and wings, but no space for turning the aircraft within the hangar. Basically, the aircraft can be parked in only one position. T-hangars are commonly "nested" with several individual storage units to maximize hangar space. In these cases, taxiway access is needed on both sides of the nested T-hangar facility. T-hangars are popular with aircraft owners with tighter budgets as they tend to be the least expensive enclosed hangar space to build and lease. There are 15 T-hangars at ODO offering 187 individual units, or approximately 222,100 sf of T-hangar storage space.

Executive hangars are another hangar type commonly used for GA aircraft storage. These hangars provide additional storage space, usually with a footprint between 2,500 and 10,000 sf. Spaces this size allow for increased aircraft maneuverability and can provide for the storage of multiple aircraft within one hangar. Some executive hangars also have space for a small office. There are six executive hangars comprising approximately 37,700 sf of storage space at ODO.

Conventional hangars are the large, clear span hangars typically located facing the main aircraft apron at airports. These hangars provide for bulk aircraft storage and are often utilized by airport businesses, such as an FBO. ODO has eight conventional hangars offering approximately 102,400 sf of storage space. For planning purposes, executive and conventional hangars have been grouped together to develop an overall total for future capacity needs.

Planning for future aircraft storage needs is based on typical owner preferences and standard sizes for hangar space. For determining future aircraft storage needs, a planning standard of 1,200 square feet per single engine piston aircraft and 1,500 sf per multi-engine piston aircraft is utilized for T-hangars. For executive/conventional hangars, a planning standard of 3,000 sf is utilized for turboprop aircraft; 5,000 sf is utilized for business jet aircraft storage needs; and 1,500 sf is utilized for helicopter storage needs. In addition, since portions of executive/conventional hangars are also used for aircraft maintenance and servicing, requirements for service hangar area were estimated using a planning standard of 250 sf.

In total, there is approximately 396,400 sf of aircraft storage capacity at ODO. With 108 aircraft currently based at the facility and more anticipated to base at the airport by the end of the planning period, expansion of hangar facilities should be planned. **Table 32** details the estimated hangar space requirements over the planning period. Over the long-term, an additional 81,800 sf of hangar space is estimated to be needed, with additional capacity needed for each storage type. Options to include these additional facilities will be explored in the next section. Construction of new hangars should be phased to meet existing demand and not tied to a particular date or timeframe. Construction can be undertaken by either the airport sponsor or private developer.

TABLE 32 | Aircraft Storage Requirements

	Current	Short Term	Intermediate Term	Long Term
Based Aircraft	108	116	125	144
T-hangar Units	187	191	196	206
T-hangar Area (sf)	222,100	226,300	231,700	143,100
Executive/Conventional Hangar area (sf)	140,100	152,600	167,100	199,100
Service Hangar Space	34,200	29,000	31,300	36,000
Total Aircraft Storage (sf)	**396,400**	**407,900**	**430,100**	**478,200**

Source: Coffman Associates analysis

Parking apron and parking position requirements have also been calculated. Parking aprons should provide space for locally based aircraft that are not in storage hangars, as well as itinerant aircraft and those that are used for training and air taxi operations. An industry planning standard of 650 square yards (sy) per local aircraft, 800 sy per itinerant aircraft, and 1,600 sy per large turboprop/jet aircraft was applied to determine required aircraft apron space. Aircraft parking position requirements have been calculated at three percent of based aircraft for local operations and 25 percent of busy day itinerant operations for transient GA operations. As jet operations are anticipated to increase over the planning period, there may be demand for more turbine aircraft parking positions.

Table 33 details parking apron and position requirements over the planning period. ODO currently has approximately 57,600 sy of aircraft parking apron available, with 53 marked parking positions. As detailed in the table, additional apron pavement is needed during the short-term, with approximately 38,900 sy anticipated to be required by the long-term. Additional marked aircraft parking will also be needed beginning in the short-term, with 61 more aircraft parking positions estimated to be needed over the next 20 years. The alternatives to follow will consider new apron space to meet this projected demand.

TABLE 33 | Aircraft Apron and Parking Requirements

	Current	Short Term	Intermediate Term	Long Term
AIRCRAFT PARKING				
Local Positions	25	35	38	43
Transient GA Positions	28	40	43	45
Corporate Jet Positions	0	8	11	16
Helicopter Positions	0	3	5	10
Total Aircraft Parking Positions	**53**	**86**	**97**	**114**
Total Apron Area (sy)	**57,600**	**69,300**	**79,700**	**96,500**
VEHICLE PARKING				
Terminal Spaces	22	34	42	68
Based Owner/Terminal Overflow	31	29	31	36
Total Vehicle Parking	**53**	**63**	**73**	**104**

Source: Coffman Associates analysis

Vehicle parking spaces for airport users have also been evaluated. Currently, the airport offers 22 paved parking spaces in front of the terminal, including two handicapped spaces, as well as 31 additional spaces in a lot immediately to the west. Parking space requirements were based upon estimated existing and future itinerant traffic, as well as based aircraft at the airport. This planning study assumes that 25 percent of based aircraft will require a vehicle parking space. **Table 33** details vehicle parking requirements for the airport. An additional 51 vehicle parking spaces are estimated to be needed by the long-term to accommodate local and transient airport users.

AIRCRAFT RESCUE AND FIREFIGHTING (ARFF)

ODO does not have an aircraft rescue and firefighting (ARFF) building or equipment located on the airfield. Because the airport is a GA airport, the FAA does not require ARFF services to be provided. The airport is anticipated to remain a GA airport through the planning period, so on-site ARFF facilities are not planned.

AVIATION FUEL STORAGE

Fuel at ODO is stored in three fuel tanks. There are two Jet A tanks with capacities of 12,000 gallons each, and one 100LL storage tank with a capacity of 10,000 gallons. Based on historic fuel flowage records from the last three years, the airport pumped an average of 450,711 gallons of Jet A and 122,342 gallons of 100LL annually. Dividing the total fuel flowage by the total number of operations provides a ratio of fuel flowage per operation. Between 2019 and 2021, the airport pumped approximately 117.7 gallons of Jet A per turbine operation and 1.63 gallons of 100LL per piston operation. It is anticipated that, over the course of the planning period, the Jet A flowage ratio will increase slightly as the airport accommodates larger jets, and the AvGas flowage ratio will remain static.

Maintaining a 14-day fuel supply would allow the airport to limit the impact of a disruption of fuel delivery. Currently, the airport has enough static fuel storage to meet the 14-day supply criteria for both Jet A and 100LL fuel. Based on these usage assumptions and projected design day operations, additional storage for Jet A is projected to be needed by the intermediate period, while 100LL storage is adequate over the planning period. **Table 34** summarizes the forecasted fuel storage requirements through the planning period.

TABLE 34 | Fuel Storage Requirements

			PLANNING HORIZON		
	Available	Current Need*	Short Term	Intermediate Term	Long Term
Jet A					
Daily Usage (gal.)		1,235	1,484	1,822	2,631
14-Day Supply (gal.)	24,000	17,300	20,800	25,500	36,800
Annual Usage (gal.)		450,711	541,600	664,900	960,200
100LL					
Daily Usage (gal.)		335	371	393	440
14-Day Supply (gal.)	10,000	4,700	5,200	5,500	6,000
Annual Usage (gal.)		122,342	135,300	143,500	160,700

*Current need reflects average of last three years' fuel flowage.

Sources: Historic fuel flowage data provided by the airport; fuel supply projections prepared by Coffman Associates.

Utilities

The availability and capacity of the utilities serving the airport are important factors in determining the development potential of the airport property, as well as the land immediately adjacent to the facility. Ultimately, the availability of water, gas, sewer, and power sources are of primary concern when assessing available utilities. Given the forecast potential for future landside facility growth, the utility infrastructure serving the airport may need to be expanded to serve future development.

Perimeter Fencing and Gates

Perimeter fencing is used at airports primarily to secure the aircraft operational area and reduce wildlife incursions. The physical barrier of perimeter fencing has the following functions:

- Gives notice of the legal boundary of the outermost limits of a facility or security-sensitive area.
- Assists in controlling and screening authorized entries into a secured area by deterring entry elsewhere along the boundary.
- Supports surveillance, detection, assessment, and other security functions by providing a zone for installing intrusion-detection equipment and closed-circuit television (CCTV).

- Deters casual intruders from penetrating a secured area by presenting a barrier that requires an overt action to enter.
- Demonstrates the intent of an intruder by their overt action of gaining entry.
- Causes a delay to obtain access to a facility, thereby increasing the possibility of detection.
- Creates a psychological deterrent.
- Optimizes the use of security personnel, while enhancing the capabilities for detection and apprehension of unauthorized individuals.
- Demonstrates a corporate concern for facility security.
- Limits inadvertent access to the aircraft operations area by wildlife.

ODO is fully enclosed by fencing. This consists of an eight-foot wildlife resistant fencing with three-strand barbed wire. Security gates limit access to the airfield. All fencing and gates should be maintained throughout the planning period. It should be noted that, in spite of the fencing, wildlife including coyotes have managed to access the airfield. The airport is currently working with a wildlife control specialist to remove the animals and prevent future access.

LANDSIDE FACILITY REQUIREMENTS SUMMARY

A summary of the landside facilities projected to be needed at ODO is presented on **Exhibit 30**.

SUMMARY

This chapter has outlined the safety design standards and facilities required to meet potential aviation demand projected at ODO for the next 20 years. The short-term roughly corresponds to a five-year timeframe, the intermediate term is approximately 10 years, and the long-term is 20 years.

In the next section, potential improvements to the airside and landside systems will be examined through a series of development alternatives. Most of the alternatives discussion will focus on those capital improvements that would be eligible for federal and state grant funds. Other projects of local concern will also be presented. Ultimately, an overall development plan that presents a vision beyond the 20-year scope of this Airport Layout Plan will be developed for ODO.

Aircraft Storage Hangar Requirements

	Available	Short Term	Intermediate Term	Long Term
T-Hangar Units (#)	187	191	196	206
T-Hangar Area (sf)	222,100	226,300	231,700	243,100
Executive/Conventional Hangar Area (sf)	140,100	152,600	167,100	199,100
Service/Maintenance Area (sf)	34,200	29,000	31,300	36,000
Total Hangar Storage Area (sf)	396,400	407,900	430,100	478,200

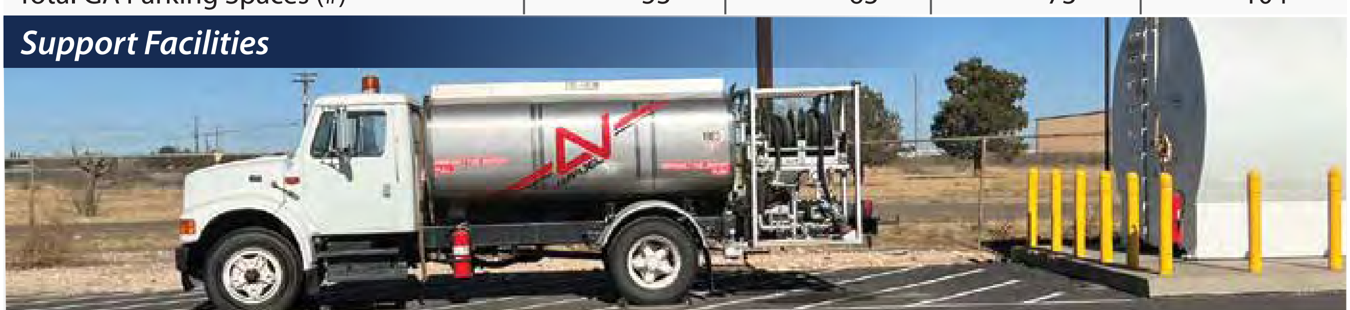
Aircraft Parking Apron

Aircraft Parking Positions (#)	53	86	97	114
Total Apron Area (sy)	57,600	69,300	79,700	96,500

General Aviation Terminal Facilities and Parking

Building Space (sf)	4,100	4,400	5,500	8,900
Total GA Parking Spaces (#)	53	63	73	104

Support Facilities



14-Day Fuel Storage - 100LL (gal.)	10,000	5,200	5,500	6,200
14-Day Fuel Storage - Jet A (gal.)	24,000	20,800	25,500	36,800

APPENDIX A

GLOSSARY OF TERMS

GLOSSARY OF TERMS

A

Above Ground Level: The elevation of a point or surface above the ground.

Accelerate-Stop Distance Available (ASDA): See declared distances.

Advisory Circular: External publications issued by the FAA consisting of non-regulatory material providing for the recommendations relative to a policy, guidance and information relative to a specific aviation subject.

Air Carrier: An operator which: (1) performs at least five round trips per week between two or more points and publishes flight schedules which specify the times, days of the week, and places between which such flights are performed; or (2) transports mail by air pursuant to a current contract with the U.S. Postal Service. Certified in accordance with Federal Aviation Regulation (FAR) Parts 121 and 127.

Air Route Traffic Control Center (ARTCC): A facility established to provide air traffic control service to aircraft operating on an IFR flight plan within controlled airspace and principally during the enroute phase of flight.

Air Taxi: An air carrier certificated in accordance with FAR Part 121 and FAR Part 135 and authorized to provide, on demand, public transportation of persons and property by aircraft. Generally operates small aircraft "for hire" for specific trips.

Air Traffic Control: A service operated by an appropriate organization for the purpose of providing for the safe, orderly, and expeditious flow of air traffic.

Air Traffic Control System Command Center: A facility operated by the FAA which is responsible for the central flow control, the central altitude reservation system, the airport reservation position system, and the air traffic service contingency command for the air traffic control system.

Air Traffic Hub: A categorization of commercial service airports or group of commercial service airports in a metropolitan or urban area based upon the proportion of annual national enplanements existing at the airport or airports. The categories are large hub, medium hub, small hub, or non-hub. It forms the basis for the apportionment of entitlement funds.

Air Transport Association Of America: An organization consisting of the principal U.S. airlines that represents the interests of the airline industry on major aviation issues before federal, state, and local government bodies. It promotes air transportation safety by coordinating industry and governmental safety programs and it serves as a focal point for industry efforts to standardize practices and enhance the efficiency of the air transportation system.

Aircraft: A transportation vehicle that is used or intended for use for flight.

Aircraft Approach Category: A grouping of aircraft based on 1.3 times the stall speed in their landing configuration at their maximum certificated landing weight. The categories are as follows:

- **Category A**: Speed less than 91 knots.
- **Category B**: Speed 91 knots or more, but less than 121 knots.
- **Category C:** Speed 121 knots or more, but less than 141 knots.

- **Category D:** Speed 141 knots or more, but less than 166 knots.
- **Category E:** Speed greater than 166 knots

Aircraft Operation: The landing, takeoff, or touch-and-go procedure by an aircraft on a runway at an airport.

Aircraft Operations Area (AOA): A restricted and secure area on the airport property designed to protect all aspects related to aircraft operations.

Aircraft Owners And Pilots Association: A private organization serving the interests and needs of general aviation pilots and aircraft owners.

Aircraft Rescue And Fire Fighting: A facility located at an airport that provides emergency vehicles, extinguishing agents, and personnel responsible for minimizing the impacts of an aircraft accident or incident.

Airfield: The portion of an airport which contains the facilities necessary for the operation of aircraft.

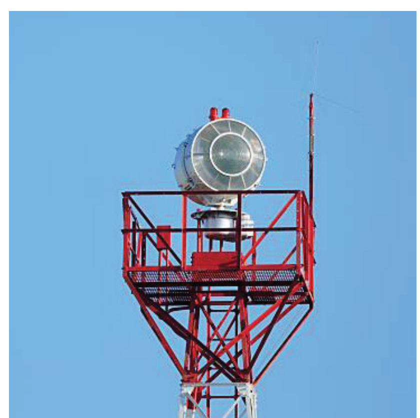
Airline Hub: An airport at which an airline concentrates a significant portion of its activity and which often has a significant amount of connecting traffic.

Airplane Design Group (ADG): A grouping of aircraft based upon wingspan. The groups are as follows:

- **Group I:** Up to but not including 49 feet.
- **Group II:** 49 feet up to but not including 79 feet.
- **Group III:** 79 feet up to but not including 118 feet.
- **Group IV:** 118 feet up to but not including 171 feet.
- **Group V:** 171 feet up to but not including 214 feet.
- **Group VI:** 214 feet or greater.

Airport Authority: A quasi-governmental public organization responsible for setting the policies governing the management and operation of an airport or system of airports under its jurisdiction.

Airport Beacon: A navigational aid located at an airport which displays a rotating light beam to identify whether an airport is lighted.


Airport Beacon

Airport Capital Improvement Plan: The planning program used by the Federal Aviation Administration to identify, prioritize, and distribute funds for airport development and the needs of the National Airspace System to meet specified national goals and objectives.

Airport Elevation: The highest point on the runway system at an airport expressed in feet above mean sea level (MSL).

Airport Improvement Program: A program authorized by the Airport and Airway Improvement Act of 1982 that provides funding for airport planning and development.

Airport Layout Drawing (ALD): The drawing of the airport showing the layout of existing and proposed airport facilities.

Airport Layout Plan (ALP): A scaled drawing of the existing and planned land and facilities necessary for the operation and development of the airport.

Airport Layout Plan Drawing Set: A set of technical drawings depicting the current and future airport conditions. The individual sheets comprising the set can vary with the complexities of the airport, but the FAA-required drawings include the Airport Layout Plan (sometimes referred to as the Airport Layout Drawing (ALD), the Airport Airspace Drawing, and the Inner Portion of the Approach Surface Drawing, On-Airport Land Use Drawing, and Property Map.

Airport Master Plan: A local planning document that serves as a guide for the long-term development of an airport.

Airport Movement Area Safety System: A system that provides automated alerts and warnings of potential runway incursions or other hazardous aircraft movement events.

Airport Obstruction Chart: A scaled drawing depicting the Federal Aviation Regulation (FAR) Part 77 surfaces, a representation of objects that penetrate these surfaces, runway, taxiway, and ramp areas, navigational aids, buildings, roads and other detail in the vicinity of an airport.

Airport Reference Code (ARC): A coding system used to relate airport design criteria to the operational (Aircraft Approach Category) to the physical characteristics (Airplane Design Group) of the airplanes intended to operate at the airport.

Airport Reference Point (ARP): The latitude and longitude of the approximate center of the airport.

Airport Sponsor: The entity that is legally responsible for the management and operation of an airport, including the fulfillment of the requirements of laws and regulations related thereto.

Airport Surface Detection Equipment: A radar system that provides air traffic controllers with a visual representation of the movement of aircraft and other vehicles on the ground on the airfield at an airport.

Airport Surveillance Radar: The primary radar located at an airport or in an air traffic control terminal area that receives a signal at an antenna and transmits the signal to air traffic control display equipment defining the location of aircraft in the air. The signal provides only the azimuth and range of aircraft from the location of the antenna.

Airport Traffic Control Tower (ATCT): A central operations facility in the terminal air traffic control system, consisting of a tower, including an associated instrument flight rule (IFR) room if radar equipped, using air/ground communications and/or radar, visual signaling and other devices to provide safe and expeditious movement of terminal air traffic.

Airside: The portion of an airport that contains the facilities necessary for the operation of aircraft.

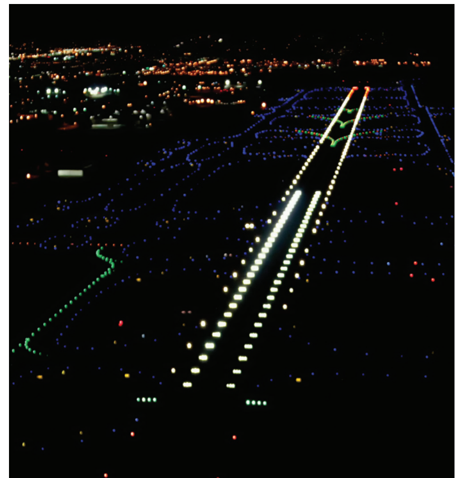
Airspace: The volume of space above the surface of the ground that is provided for the operation of aircraft.

Alert Area: See special-use airspace.

Altitude: The vertical distance measured in feet above mean sea level.

Annual Instrument Approach (AIA): An approach to an airport with the intent to land by an aircraft in accordance with an IFR flight plan when visibility is less than three miles and/or when the ceiling is at or below the minimum initial approach altitude.

Approach Lighting System (ALS): An airport lighting facility which provides visual guidance to landing aircraft by radiating light beams by which the pilot aligns the aircraft with the extended centerline of the runway on final approach and landing.



Approach Lighting System

Approach Minimums: The altitude below which an aircraft may not descend while on an IFR approach unless the pilot has the runway in sight.

Approach Surface: An imaginary obstruction limiting surface defined in FAR Part 77 which is longitudinally centered on an extended runway centerline and extends outward and upward from the primary surface at each end of a runway at a designated slope and distance based upon the type of available or planned approach by aircraft to a runway.

Apron: A specified portion of the airfield used for passenger, cargo or freight loading and unloading, aircraft parking, and the refueling, maintenance and servicing of aircraft.

Area Navigation: The air navigation procedure that provides the capability to establish and maintain a flight path on an arbitrary course that remains within the coverage area of navigational sources being used.

Automated Terminal Information Service (ATIS): The continuous broadcast of recorded non-control information at towered airports. Information typically includes wind speed, direction, and runway in use.

Automated Surface Observation System (ASOS): A reporting system that provides frequent airport ground surface weather observation data through digitized voice broadcasts and printed reports.

Automatic Weather Observation System (AWOS): Equipment used to automatically record weather conditions (i.e., cloud height, visibility, wind speed and direction, temperature, dew point, etc.)

Automatic Direction Finder (ADF): An aircraft radio navigation system which senses and indicates the direction to a non-directional radio beacon (NDB) ground transmitter.

Avigation Easement: A contractual right or a property interest in land over which a right of unobstructed flight in the airspace is established.

Azimuth: Horizontal direction expressed as the angular distance between true north and the direction of a fixed point (as the observer's heading).

B

Base Leg: A flight path at right angles to the landing runway off its approach end. The base leg normally extends from the downwind leg to the intersection of the extended runway centerline. See "traffic pattern."

Based Aircraft: The general aviation aircraft that use a specific airport as a home base.

Bearing: The horizontal direction to or from any point, usually measured clockwise from true north or magnetic north.

Blast Fence: A barrier used to divert or dissipate jet blast or propeller wash.

Blast Pad: A prepared surface adjacent to the end of a runway for the purpose of eliminating the erosion of the ground surface by the wind forces produced by airplanes at the initiation of takeoff operations.

Building Restriction Line (BRL): A line which identifies suitable building area locations on the airport.


Blast Fence

C

Capital Improvement Plan: The planning program used by the Federal Aviation Administration to identify, prioritize, and distribute Airport Improvement Program funds for airport development and the needs of the National Airspace System to meet specified national goals and objectives.

Cargo Service Airport: An airport served by aircraft providing air transportation of property only, including mail, with an annual aggregate landed weight of at least 100,000,000 pounds.

Ceiling: The height above the ground surface to the location of the lowest layer of clouds which is reported as either broken or overcast.

Circling Approach: A maneuver initiated by the pilot to align the aircraft with the runway for landing when flying a predetermined circling instrument approach under IFR.

Class A Airspace: See Controlled Airspace.

Class B Airspace: See Controlled Airspace.

Class C Airspace: See Controlled Airspace.

Class D Airspace: See Controlled Airspace.

Class E Airspace: See Controlled Airspace.

Class G Airspace: See Controlled Airspace.

Clear Zone: See Runway Protection Zone.

Commercial Service Airport: A public airport providing scheduled passenger service that enplanes at least 2,500 annual passengers.

Common Traffic Advisory Frequency (CTAF): A radio frequency identified in the appropriate aeronautical chart which is designated for the purpose of transmitting airport advisory information and procedures while operating to or from an uncontrolled airport.

Compass Locator (LOM): A low power, low/medium frequency radio-beacon installed in conjunction with the instrument landing system at one or two of the marker sites.

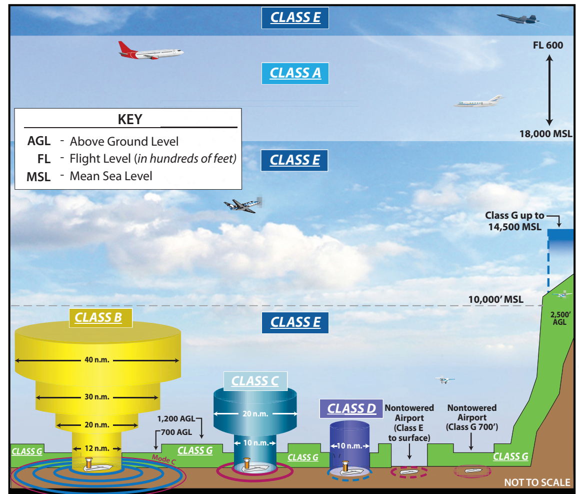
Conical Surface: An imaginary obstruction- limiting surface defined in FAR Part 77 that extends from the edge of the horizontal surface outward and upward at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

Controlled Airport: An airport that has an operating airport traffic control tower.

Controlled Airspace: Airspace of defined dimensions within which air traffic control services are provided to instrument flight rules (IFR) and visual flight rules (VFR) flights in accordance with the airspace classification. Controlled airspace in the United States is designated as follows:

CLASS A: Generally, the airspace from 18,000 feet mean sea level (MSL) up to but not including flight level FL600. All persons must operate their aircraft under IFR.

CLASS B: Generally, the airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports. The configuration of Class B airspace is unique to each airport, but typically consists of two or more layers of air space and is designed to contain all published instrument approach procedures to the airport. An air traffic control clearance is required for all aircraft to operate in the area.



Airspace Classifications

CLASS C: Generally, the airspace from the surface to 4,000 feet above the airport elevation (charted as MSL) surrounding those airports that have an operational control tower and radar approach control and are served by a qualifying number of IFR operations or passenger enplanements. Although individually tailored for each airport, Class C airspace typically consists of a surface area with a five nautical mile (nm) radius and an outer area with a 10 nautical mile radius that extends from 1,200 feet to 4,000 feet above the airport elevation. Two-way radio communication is required for all aircraft.

CLASS D: Generally, that airspace from the surface to 2,500 feet above the airport elevation (charted as MSL) surrounding those airports that have an operational control tower. Class D airspace is individually tailored and configured to encompass published instrument approach procedure. Unless otherwise authorized, all persons must establish two-way radio communication.

CLASS E: Generally, controlled airspace that is not classified as Class A, B, C, or D. Class E airspace extends upward from either the surface or a designated altitude to the overlying or adjacent controlled airspace. When designated as a surface area, the airspace will be configured to contain all instrument procedures. Class E airspace encompasses all Victor Airways. Only aircraft following instrument flight rules are required to establish two-way radio communication with air traffic control.

CLASS G: Generally, that airspace not classified as Class A, B, C, D, or E. Class G airspace is uncontrolled for all aircraft. Class G airspace extends from the surface to the overlying Class E airspace.

Controlled Firing Area: See special-use airspace.

Crosswind: A wind that is not parallel to a runway centerline or to the intended flight path of an aircraft.

Crosswind Component: The component of wind that is at a right angle to the runway centerline or the intended flight path of an aircraft.

Crosswind Leg: A flight path at right angles to the landing runway off its upwind end. See "traffic pattern."

D

Decibel: A unit of noise representing a level relative to a reference of a sound pressure 20 micro newtons per square meter.

Decision Height/Decision Altitude: The height above the end of the runway surface at which a decision must be made by a pilot during the ILS or Precision Approach Radar approach to either continue the approach or to execute a missed approach.

Declared Distances: The distances declared available for the airplane's takeoff runway, takeoff distance, accelerate-stop distance, and landing distance requirements. The distances are:

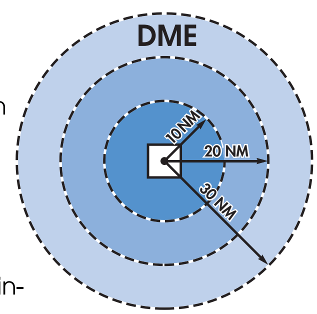
- **Takeoff Run Available (TORA):** The runway length declared available and suitable for the ground run of an airplane taking off.
- **Takeoff Distance Available (TODA):** The TORA plus the length of any remaining runway and/or clear way beyond the far end of the TORA.
- **Accelerate-stop Distance Available (ASDA):** The runway plus stopway length declared available for the acceleration and deceleration of an aircraft aborting a takeoff.
- **Landing Distance Available (LDA):** The runway length declared available and suitable for landing.

Department Of Transportation: The cabinet level federal government organization consisting of modal operating agencies, such as the Federal Aviation Administration, which was established to promote the coordination of federal transportation programs and to act as a focal point for research and development efforts in transportation.

Discretionary Funds: Federal grant funds that may be appropriated to an airport based upon designation by the Secretary of Transportation or Congress to meet a specified national priority such as enhancing capacity, safety, and security, or mitigating noise.

Displaced Threshold: A threshold that is located at a point on the runway other than the designated beginning of the runway.

Distance Measuring Equipment (DME): Equipment (airborne and ground) used to measure, in nautical miles, the slant range distance of an aircraft from the DME navigational aid.



DNL: The 24-hour average sound level, in decibels, obtained after the addition of ten decibels to sound levels for the periods between 10 p.m. and 7 a.m. as averaged over a span of one year. It is the FAA standard metric for determining the cumulative exposure of individuals to noise.

Downwind Leg: A flight path parallel to the landing runway in the direction opposite to landing. The downwind leg normally extends between the crosswind leg and the base leg. Also see "traffic pattern."

E

Easement: The legal right of one party to use a portion of the total rights in real estate owned by another party. This may include the right of passage over, on, or below the property; certain air rights above the property, including view rights; and the rights to any specified form of development or activity, as well as any other legal rights in the property that may be specified in the easement document.

Elevation: The vertical distance measured in feet above mean sea level.

Enplaned Passengers: The total number of revenue passengers boarding aircraft, including originating, stop-over, and transfer passengers, in scheduled and nonscheduled services.

Enplanement: The boarding of a passenger, cargo, freight, or mail on an aircraft at an airport.

Entitlement: Federal funds for which a commercial service airport may be eligible based upon its annual passenger enplanements.

Environmental Assessment (EA): An environmental analysis performed pursuant to the National Environmental Policy Act to determine whether an action would significantly affect the environment and thus require a more detailed environmental impact statement.

Environmental Audit: An assessment of the current status of a party's compliance with applicable environmental requirements of a party's environmental compliance policies, practices, and controls.

Environmental Impact Statement (EIS): A document required of federal agencies by the National Environmental Policy Act for major projects or legislative proposals affecting the environment. It is a tool for decision-making describing the positive and negative effects of a proposed action and citing alternative actions.

Essential Air Service: A federal program which guarantees air carrier service to selected small cities by providing subsidies as needed to prevent these cities from such service.

F

Federal Aviation Regulations: The general and permanent rules established by the executive departments and agencies of the Federal Government for aviation, which are published in the Federal Register. These are the aviation subset of the Code of Federal Regulations.

Federal Inspection Services: The provision of customs and immigration services including passport inspection, inspection of baggage, the collection of duties on certain imported items, and the inspections for agricultural products, illegal drugs, or other restricted items.

Final Approach: A flight path in the direction of landing along the extended runway centerline. The final approach normally extends from the base leg to the runway. See "traffic pattern."

Final Approach and Takeoff Area (FATO): A defined area over which the final phase of the helicopter approach to a hover, or a landing is completed and from which the takeoff is initiated.

Final Approach Fix: The designated point at which the final approach segment for an aircraft landing on a runway begins for a non-precision approach.

Finding Of No Significant Impact (FONSI): A public document prepared by a Federal agency that presents the rationale why a proposed action will not have a significant effect on the environment and for which an environmental impact statement will not be prepared.

Fixed Base Operator (FBO): A provider of services to users of an airport. Such services include, but are not limited to, hangaring, fueling, flight training, repair, and maintenance.

Flight Level: A measure of altitude used by aircraft flying above 18,000 feet. Flight levels are indicated by three digits representing the pressure altitude in hundreds of feet. An airplane flying at flight level 360 is flying at a pressure altitude of 36,000 feet. This is expressed as FL 360.

Flight Service Station (FSS): An operations facility in the national flight advisory system which utilizes data interchange facilities for the collection and dissemination of Notices to Airmen, weather, and administrative data and which provides preflight and in-flight advisory services to pilots through air and ground based communication facilities.

Frangible Navaid: A navigational aid which retains its structural integrity and stiffness up to a designated maximum load, but on impact from a greater load, breaks, distorts, or yields in such a manner as to present the minimum hazard to aircraft.

G

General Aviation: That portion of civil aviation which encompasses all facets of aviation except air carriers holding a certificate of convenience and necessity, and large aircraft commercial operators.

General Aviation Airport: An airport that provides air service to only general aviation.

Glideslope (GS): Provides vertical guidance for aircraft during approach and landing. The glideslope consists of the following:

- Electronic components emitting signals which provide vertical guidance by reference to airborne instruments during instrument approaches such as ILS; or
- Visual ground aids, such as PAPI, which provide vertical guidance for VFR approach or for the visual portion of an instrument approach and landing.

Global Positioning System (GPS): A system of satellites used as reference points to enable navigators equipped with GPS receivers to determine their latitude, longitude, and altitude.

Ground Access: The transportation system on and around the airport that provides access to and from the airport by ground transportation vehicles for passengers, employees, cargo, freight, and airport services.

Ground Based Augmentation System (GBAS): A program that augments the existing GPS system by providing corrections to aircraft in the vicinity of an airport in order to improve the accuracy of these aircrafts' GPS navigational position

H

Helipad: A designated area for the takeoff, landing, and parking of helicopters.

High Intensity Runway Lights (HIRL): The highest classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

High-speed Exit Taxiway: An acute-angled exit taxiway forming a 30 degree angle with the runway centerline, designed to allow an aircraft to exit a runway without having to decelerate to typical taxi speed.

Horizontal Surface: An imaginary obstruction-limiting surface defined in FAR Part 77 that is specified as a portion of a horizontal plane surrounding a runway located 150 feet above the established airport elevation. The specific horizontal dimensions of this surface are a function of the types of approaches existing or planned for the runway.

Hot Spot: A location on an airport movement area with a history of potential risk of collision or runway incursion, and where heightened attention by pilots and drivers is necessary.

I

Initial Approach Fix: The designated point at which the initial approach segment begins for an instrument approach to a runway.

Instrument Approach Procedure: A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing, or to a point from which a landing may be made visually.

Instrument Flight Rules (IFR): Procedures for the conduct of flight in weather conditions below Visual Flight Rules weather minimums. The term IFR is often also used to define weather conditions **and the type of flight plan under which an aircraft is operating.**

Instrument Landing System (ILS): A precision instrument approach system which normally consists of the following electronic components and visual aids:

1. Localizer	3. Outer Marker	5. Approach Lights
2. Glide Slope	4. Middle Marker	

Instrument Meteorological Conditions: Meteorological conditions expressed in terms of specific visibility and ceiling conditions that are less than the minimums specified for visual meteorological conditions.

Itinerant Operations: Operations by aircraft that are arriving from outside the traffic pattern or departing the airport traffic pattern.

K

Knots: A unit of speed length used in navigation that is equivalent to the number of nautical miles traveled in one hour.

L

Landside: The portion of an airport that provides the facilities necessary for the processing of passengers, cargo, freight, and ground transportation vehicles.

Landing Distance Available (LDA): See declared distances.

Large Airplane: An airplane that has a maximum certified takeoff weight in excess of 12,500 pounds.

Local Operations: Aircraft operations performed by aircraft that operate in the local traffic pattern or within sight of the airport, that are known to be departing for or arriving from flights in local practice areas within a prescribed distance from the airport, or that execute simulated instrument approaches at the airport. Typically, this includes touch and-go training operations.

Localizer: The component of an ILS which provides course guidance to the runway.

Localizer Type Directional Aid (LDA): A facility of comparable utility and accuracy to a localizer but is not part of a complete ILS and is not aligned with the runway.


Localizer

Low Intensity Runway Lights: The lowest classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

M

Medium Intensity Runway Lights: The middle classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

Military Operations: Aircraft operations that are performed in military aircraft.

Military Operations Area (MOA): See special-use airspace

Military Training Route: An air route depicted on aeronautical charts for the conduct of military flight training at speeds above 250 knots.

Missed Approach Course (MAC): The flight route to be followed if, after an instrument approach, a landing is not affected, and occurring normally:

- When the aircraft has descended to the decision height and has not established visual contact; or
- When directed by air traffic control to pull up or to go around again.

Movement Area: The runways, taxiways, and other areas of an airport which are utilized for taxiing/hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports with a tower, air traffic control clearance is required for entry onto the movement area.

N

National Airspace System (NAS): The network of air traffic control facilities, air traffic control areas, and navigational facilities through the U.S.

National Plan Of Integrated Airport Systems (NPIAS): The national airport system plan developed by the Secretary of Transportation on a biannual basis for the development of public use airports to meet national air transportation needs.

National Transportation Safety Board: A federal government organization established to investigate and determine the probable cause of transportation accidents, to recommend equipment and procedures to enhance transportation safety, and to review on appeal the suspension or revocation of any certificates or licenses issued by the Secretary of Transportation.

Nautical Mile: A unit of length used in navigation which is equivalent to the distance spanned by one minute of arc in latitude, that is, 1,852 meters or 6,076 feet. It is equivalent to approximately 1.15 statute mile.

Navaid: A term used to describe any electrical or visual air navigational aids, lights, signs, and associated supporting equipment (i.e., PAPI, VASI, ILS, etc.)

Navigational Aid: A facility used as, available for use as, or designed for use as an aid to air navigation.

Noise Contour: A continuous line on a map of the airport vicinity connecting all points of the same noise exposure level.

Non-directional Beacon (NDB): A beacon transmitting nondirectional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine their bearing to and from the radio beacon and home on, or track to, the station. When the radio beacon is installed in conjunction with the Instrument Landing System marker, it is normally called a Compass Locator.


NDB

Non-precision Approach Procedure: A standard instrument approach procedure in which no electronic glide slope is provided, such as VOR, TACAN, NDB, or LOC.

Notice To Air Missions (NOTAM): A notice containing information concerning the establishment, condition, or change in any component of or hazard in the National Airspace System, the timely knowledge of which is considered essential to personnel concerned with flight operations.

O

Object Free Area (OFA): An area on the ground centered on a runway, taxiway, or taxilane centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

Obstacle Free Zone (OFZ): The airspace below 150 feet above the established airport elevation and along the runway and extended runway centerline that is required to be kept clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance for aircraft landing or taking off from the runway, and for missed approaches.

Operation: The take-off, landing, or touch-and-go procedure by an aircraft on a runway at an airport.

Outer Marker (OM): An ILS navigation facility in the terminal area navigation system located four to seven miles from the runway edge on the extended centerline, indicating to the pilot that he/she is passing over the facility and can begin final approach.

P

Pilot-controlled Lighting: Runway lighting systems at an airport that are controlled by activating the microphone of a pilot on a specified radio frequency.

Precision Approach: A standard instrument approach procedure which provides runway alignment and glide slope (descent) information. It is categorized as follows:

- **CATEGORY I (CAT I):** A precision approach which provides for approaches with a decision height of not less than 200 feet and visibility not less than 1/2 mile or Runway Visual Range (RVR) 2400 (RVR 1800) with operative touchdown zone and runway centerline lights.
- **CATEGORY II (CAT II):** A precision approach which provides for approaches with a decision height of not less than 100 feet and visibility not less than 1200 feet RVR.
- **CATEGORY III (CAT III):** A precision approach which provides for approaches with minimal less than Category II.

Precision Approach Path Indicator (PAPI): A lighting system providing visual approach slope guidance to aircraft during a landing approach. A PAPI normally consists of four light units but an abbreviated system of two lights is acceptable for some categories of aircraft.

Precision Approach Path Indicator

Precision Approach Radar: A radar facility in the terminal air traffic control system used to detect and display with a high degree of accuracy the direction, range, and elevation of an aircraft on the final approach to a runway.

Precision Object Free Zone (POFZ): An area centered on the extended runway centerline, beginning at the runway threshold and extending behind the runway threshold that is 200 feet long by 800 feet wide. The POFZ is a clearing standard which requires the POFZ to be kept clear of above ground objects protruding above the runway safety area edge elevation (except for frangible NAVAIDS). The POFA is only in effect when the approach includes vertical guidance, the reported ceiling is below 250 feet, and an aircraft is on final approach within two miles of the runway threshold.

Primary Airport: A commercial service airport that enplanes at least 10,000 annual passengers.

Primary Surface: An imaginary obstruction limiting surface defined in FAR Part 77 that is specified as a rectangular surface longitudinally centered about a runway. The specific dimensions of this surface are a function of the types of approaches existing or planned for the runway.

Prohibited Area: See special-use airspace.

PVC: Poor visibility and ceiling. Used in determining Annual Service Volume. PVC conditions exist when the cloud ceiling is less than 500 feet and visibility is less than one mile.

R

Radial: A navigational signal generated by a Very High Frequency Omni-directional Range or VORTAC station that is measured as an azimuth from the station.

Regression Analysis: A statistical technique that seeks to identify and quantify the relationships between factors associated with a forecast.

Remote Communications Outlet (RCO): An unstaffed transmitter receiver/facility remotely controlled by air traffic personnel. RCOs serve flight service stations (FSSs). RCOs were established to provide ground-to-ground communications between air traffic control specialists and pilots at satellite airports for delivering enroute clearances, issuing departure authorizations, and acknowledging instrument flight rules cancellations or departure/landing times.

Remote Transmitter/receiver (RTR): See remote communications outlet. RTRs serve ARTCCs.

Reliever Airport: An airport to serve general aviation aircraft which might otherwise use a congested air-carrier served airport.

Restricted Area: See special-use airspace.

RNAV: Area navigation - airborne equipment which permits flights over determined tracks within prescribed accuracy tolerances without the need to overfly ground-based navigation facilities. Used enroute and for approaches to an airport.

Runway: A defined rectangular area on an airport prepared for aircraft landing and takeoff. Runways are normally numbered in relation to their magnetic direction, rounded off to the nearest 10 degrees. For example, a runway with a magnetic heading of 180 would be designated Runway 18. The runway heading on the opposite end of the runway is 180 degrees from that runway end. For example, the opposite runway heading for Runway 18 would be Runway 36 (magnetic heading of 360). Aircraft can takeoff or land from either end of a runway, depending upon wind direction.

Runway Alignment Indicator Light (RAIL): A series of high intensity sequentially flashing lights installed on the extended centerline of the runway usually in conjunction with an approach lighting system.

Runway Design Code: A code signifying the FAA design standards to which the runway is to be built.

Runway End Identification Lighting (REIL): Two synchronized flashing lights, one on each side of the runway threshold, which provide rapid and positive identification of the approach end of a particular runway.

REIL

Runway Gradient: The average slope, measured in percent, between the two ends of a runway.

Runway Protection Zone (RPZ): An area off the runway end to enhance the protection of people and property on the ground. The RPZ is trapezoidal in shape. Its dimensions are determined by the aircraft approach speed and runway approach type and minimal.

Runway Reference Code: A code signifying the current operational capabilities of a runway and taxiway.

Runway Safety Area (RSA): A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.

Runway Visibility Zone (RVZ): An area on the airport to be kept clear of permanent objects so that there is an unobstructed line of sight from any point five feet above the runway centerline to any point five feet above an intersecting runway centerline.

Runway Visual Range (RVR): An instrumentally derived value, in feet, representing the horizontal distance a pilot can see down the runway from the runway end.

S

Scope: The document that identifies and defines the tasks, emphasis, and level of effort associated with a project or study.

Segmented Circle: A system of visual indicators designed to provide traffic pattern information at airports without operating control towers, often co-located with a wind cone.

Shoulder: An area adjacent to the edge of paved runways, taxiways, or aprons providing a transition between the pavement and the adjacent surface; support for aircraft running off the pavement; enhanced drainage; and blast protection. The shoulder Does Not Necessarily Need To Be Paved.

Slant-range Distance: The straight line distance between an aircraft and a point on the ground.

Small Aircraft: An aircraft that has a maximum certified takeoff weight of up to 12,500 pounds.

Special-use Airspace: Airspace of defined dimensions identified by a surface area wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. Special-use airspace classifications include:

- **ALERT AREA:** Airspace which may contain a high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft.
- **CONTROLLED FIRING AREA:** Airspace wherein activities are conducted under conditions so controlled as to eliminate hazards to nonparticipating aircraft and to ensure the safety of persons or property on the ground.
- **MILITARY OPERATIONS AREA (MOA):** Designated airspace with defined vertical and lateral dimensions established outside Class A airspace to separate/segregate certain military activities from instrument flight rule (IFR) traffic and to identify for visual flight rule (VFR) traffic where these activities are conducted.
- **PROHIBITED AREA:** Designated airspace within which the flight of aircraft is prohibited.
- **RESTRICTED AREA:** Airspace designated under Federal Aviation Regulation (FAR) 73, within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Most restricted areas are designated joint use. When not in use by the using agency, IFR/VFR operations can be authorized by the controlling air traffic control facility.
- **WARNING AREA:** Airspace which may contain hazards to nonparticipating aircraft.

Standard Instrument Departure (SID): A preplanned coded air traffic control IFR departure routing, preprinted for pilot use in graphic and textual form only.

Standard Instrument Departure Procedures: A published standard flight procedure to be utilized following takeoff to provide a transition between the airport and the terminal area or enroute airspace.

Standard Terminal Arrival Route (STAR): A preplanned coded air traffic control IFR arrival routing, preprinted for pilot use in graphic and textual or textual form only.

Stop-and-go: A procedure wherein an aircraft will land, make a complete stop on the runway, and then commence a takeoff from that point. A stop-and-go is recorded as two operations: one operation for the landing and one operation for the takeoff.

Stopway: An area beyond the end of a takeoff runway that is designed to support an aircraft during an aborted takeoff without causing structural damage to the aircraft. It is not to be used for takeoff, landing, or taxiing by aircraft.

Straight-in Landing/approach: A landing made on a runway aligned within 30 degrees of the final approach course following completion of an instrument approach.

T

Tactical Air Navigation (TACAN): An ultrahigh frequency electronic air navigation system which provides suitably equipped aircraft a continuous indication of bearing and distance to the TACAN station.

Takeoff Runway Available (TORA): See declared distances.

Takeoff Distance Available (TODA): See declared distances.

Taxilane: A taxiway designed for low speed and precise taxiing. Taxilanes are usually, but not always, located outside the movement area and provide access to from taxiways to aircraft parking positions and other terminal areas.

Taxiway: A defined path established for the taxiing of aircraft from one part of an airport to another.

Taxiway Design Group: A classification of airplanes based on outer to outer Main Gear Width (MGW) and Cockpit to Main Gear (CMG) distance.

Taxiway Safety Area (TSA): A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway.

Terminal Instrument Procedures: Published flight procedures for conducting instrument approaches to runways under instrument meteorological conditions.

Terminal Radar Approach Control: An element of the air traffic control system responsible for monitoring the enroute and terminal segment of air traffic in the airspace surrounding airports with moderate to high levels of air traffic.

Tetrahedron: A device used as a landing direction indicator. The small end of the tetrahedron points in the direction of landing.

Tetrahedron

Threshold: The beginning of that portion of the runway available for landing. In some instances, the threshold may be displaced.

Touch-and-go: An operation by an aircraft that lands and departs on a runway without stopping or exiting the runway. A touch-and-go is recorded as two operations: one operation for the landing and one operation for the takeoff.

Touchdown: The point at which a landing aircraft makes contact with the runway surface.

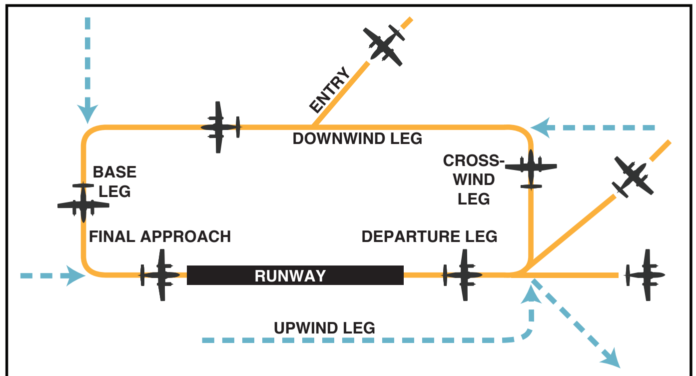
Touchdown and Lift-off Area (TLOF): A load bearing, generally paved area, normally centered in the FATO, on which a helicopter lands or takes off.

Touchdown Zone (TDZ): The first 3,000 feet of the runway beginning at the threshold.

Touchdown Zone Elevation (TDZE): The highest elevation in the touchdown zone.

Touchdown Zone Lighting: Two rows of transverse light bars located symmetrically about the runway centerline normally at 100-foot intervals. The basic system extends 3,000 feet along the runway.

Traffic Pattern: The traffic flow that is prescribed for aircraft landing at or taking off from an airport. The components of a typical traffic pattern are the upwind leg, crosswind leg, downwind leg, base leg, and final approach.



Traffic Pattern

U

Uncontrolled Airport: An airport without an airport traffic control tower at which the control of Visual Flight Rules traffic is not exercised.

Uncontrolled Airspace: Airspace within which aircraft are not subject to air traffic control.

Universal Communication (UNICOM): A nongovernment communication facility which may provide airport information at certain airports. Locations and frequencies of UNICOMs are shown on aeronautical charts and publications.

Upwind Leg: A flight path parallel to the landing runway in the direction of landing. See "traffic pattern."

V

Vector: A heading issued to an aircraft to provide navigational guidance by radar.

Very High Frequency/ Omnidirectional Range (VOR): A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in azimuth, oriented from magnetic north. Used as the basis for navigation in the national airspace system. The VOR periodically identifies itself by Morse Code and may have an additional voice identification feature.

Very High Frequency Omnidirectional Range/ Tactical Air Navigation (VORTAC): A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance-measuring equipment (DME) at one site.

Victor Airway: A system of established routes that run along specified VOR radials, from one VOR station to another.

Visual Approach: An approach wherein an aircraft on an IFR flight plan, operating in VFR conditions under the control of an air traffic control facility and having an air traffic control authorization, may proceed to the airport of destination in VFR conditions.

Visual Approach Slope Indicator (VASI): An airport lighting facility providing vertical visual approach slope guidance to aircraft during approach to landing. The VASI is now obsolete and is being replaced with the PAPI.

Visual Flight Rules (VFR): Rules that govern the procedures for conducting flight under visual conditions. The term VFR is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan.

Visual Meteorological Conditions: Meteorological conditions expressed in terms of specific visibility and ceiling conditions which are equal to or greater than the threshold values for instrument meteorological conditions.

Visual Runway: A runway without an existing or planned instrument approach.

VOR: See "Very High Frequency Omnidirectional Range Station."

VORTAC: See "Very High Frequency Omnidirectional Range Station/Tactical Air Navigation."

W

Warning Area: See special-use airspace.

Wide Area Augmentation System: An enhancement of the Global Positioning System that includes integrity broadcasts, differential corrections, and additional ranging signals for the purpose of providing the accuracy, integrity, availability, and continuity required to support all phases of flight.

Windsock/Windcone: A visual aid that indicates the prevailing wind direction and intensity at a particular location.


Windsock/Windcone

Abbreviations

AC: advisory circular

ACIP: airport capital improvement program

ADF: automatic direction finder

ADG: airplane design group

AFSS: automated flight service station

AGL: above ground level

AIA: annual instrument approach

AIP: Airport Improvement Program

AIR-21: Wendell H. Ford Aviation Investment and Reform Act for the 21st Century

ALS: approach lighting system

ALSF-1: standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT I configuration)

ALSF-2: standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT II configuration)

AOA: Aircraft Operation Area

APRC: approach reference code

APV: instrument approach procedure with vertical guidance

ARC: airport reference code

ARFF: aircraft rescue and fire fighting

ARP: airport reference point

ARTCC: air route traffic control center

ASDA: accelerate-stop distance available

ASR: airport surveillance radar

ASOS: automated surface observation station

ATC: airport traffic control

ATCT: airport traffic control tower

ATIS: automated terminal information service

AVGAS: aviation gasoline - typically 100 low lead (100LL)

AWOS: automatic weather observation station

BRL: building restriction line

CFR: Code of Federal Regulation

CIP: capital improvement program

DME: distance measuring equipment

DNL: day-night noise level

DPRC: departure reference code

DWL: runway weight bearing capacity of aircraft with dual-wheel type landing gear

DTWL: runway weight bearing capacity of aircraft with dual-tandem type landing gear

FAA: Federal Aviation Administration

FAR: Federal Aviation Regulation

FBO: fixed base operator

FY: fiscal year

GA: general aviation

GPS: global positioning system

GS: glide slope

HIRL: high intensity runway edge lighting

IFR: instrument flight rules (FAR Part 91)

ILS: instrument landing system

IM: inner marker

LDA: localizer type directional aid

LDA: landing distance available

LIRL: low intensity runway edge lighting

LMM: compass locator at middle marker

LNAV: lateral navigation

LOC: localizer

LOM: compass locator at outer marker

LP: localizer performance

LPV: localizer performance with vertical guidance

MALS: medium intensity approach lighting system

MALSR: MALS with runway alignment indicator lights

MALSF: MALS with sequenced flashers

MIRL: medium intensity runway edge lighting

MITL: medium intensity taxiway edge lighting

MLS: microwave landing system

MM: middle marker

MOA: military operations area

MSL: mean sea level

MTOW: maximum takeoff weight

NAVAID: navigational aid

NDB: nondirectional radio beacon

NEPA: National Environmental Policy Act

NM: nautical mile (6,076.1 feet)

NPDES: National Pollutant Discharge Elimination System

NPIAS: National Plan of Integrated Airport Systems

NPRM: notice of proposed rule making

ODALS: omnidirectional approach lighting system

OFA: object free area

OFZ: obstacle free zone

OM: outer marker

PAPI: precision approach path indicator

PFC: porous friction course

PFC: passenger facility charge

PCI: pavement condition index

PCL: pilot-controlled lighting

PIW: public information workshop

POFZ: precision object free zone

PVC: poor visibility and ceiling

RCO: remote communications outlet

RDC: runway design code

REIL: runway end identification lighting

RNAV: area navigation

RPZ: runway protection zone

RSA: runway safety area

RTR: remote transmitter/receiver

RVR: runway visibility range

RVZ: runway visibility zone

SALS: short approach lighting system

SASP: state aviation system plan

SEL: sound exposure level

SID: standard instrument departure

SM: statute mile (5,280 feet)

SRE: snow removal equipment

SSALF: simplified short approach lighting system with runway alignment indicator lights

STAR: standard terminal arrival route

SWL: runway weight bearing capacity for aircraft with single-wheel tandem type landing gear

TACAN: tactical air navigational aid

TAF: Federal Aviation Administration (FAA) Terminal Area Forecast

TDG: taxiway design group

TLOF: Touchdown and lift-off

TDZ: touchdown zone

TDZE: touchdown zone elevation

TODA: takeoff distance available

TORA: takeoff runway available

TRACON: terminal radar approach control

VASI: visual approach slope indicator

VFR: visual flight rules (FAR Part 91)

VHF: very high frequency

VOR: very high frequency omni-directional range

VORTAC: VOR and TACAN collocated

WAAS: wide area augmentation system

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ODESSA AIRPORT SCHLEMEYER FIELD

Airport Layout Plan and Narrative

Phase Two

DRAFT

AIRPORT DEVELOPMENT ALTERNATIVES

This section identifies and evaluates various airside development factors at ODO to meet the requirements set forth in the previous section. Airside facilities are, by nature, the focal point of an airport complex. Because of their primary role and the fact that they physically dominate airport land use, airfield facility needs are often the most critical factor in the determination of viable development options. Each functional area interrelates and affects the development potential of the others. Therefore, all areas are examined individually, and then coordinated as a whole, to ensure the final plan is functional, efficient, and cost-effective. The total impact of all these factors on the airport must be evaluated to determine if the investment in ODO will meet the aviation needs of Ector County and the region, both during and beyond the 20-year planning period.

The alternatives to follow will examine airside improvement opportunities to meet design standards and/or capacity constraints. The primary airside planning issues to be considered in this alternatives analysis are:

- Continuation of the three-runway system or potential closure of one runway, based upon best runway alignments as determined by wind coverage and surrounding land uses
- Meet ultimate RDC C-III-2400 design standards on the primary runway and B-II-5000 design standards on the crosswind and/or 'additional' runway
- Runway extension options to better accommodate turboprop and business jet operations
- Obstruction mitigation in existing/ultimate safety areas (RSA and ROFA) and incompatibility analysis in existing/ultimate RPZs
- Property acquisition (in fee or avigation easement) to maintain control of safety areas (in all forms) for the existing/ultimate condition
- Corrective measures for non-standard taxiway geometry (direct access, high-energy crossings, acute-angled intersections, non-standard holding bays, non-standard taxiway fillets)
- Added/upgraded airfield navigation and lighting equipment
- New and/or improved instrument approach capability

RUNWAY SYSTEM

A primary consideration of this study is an evaluation of the continued need for the existing three-runway system. As outlined in previous sections, the current three-runway system at ODO is being evaluated to determine if three runways are necessary/justified or if a two-runway system is a more appropriate layout. The FAA will not support two crosswind runways, nor will they support a third (additional) runway unless there is enough operational demand to justify it. TxDOT/FAA currently consider only Runways 11-29 and 16-34 eligible for grant funding, while Ector County funds maintenance and improvements to Runway 2-20 (not currently eligible for grant funding).

Exhibit 26, included previously, depicted wind coverage provided by each runway pair during all-weather and IFR conditions. At ODO, a crosswind runway is justified per FAA design standards as no singular runway alignment affords adequate wind coverage (i.e., greater than 95 percent crosswind component); however, a third runway is not justified for federal/state grant funding support. When considering a two-runway system, the best overall wind coverage is provided by the combination of Runway 11-29 and Runway 2-20, which provides 96.37 percent coverage in 10.5-knot conditions and greater than 99.02 percent coverage in 13-knot and above conditions. The next best pairing is Runway 16-34 and Runway 2-20, which provides for 95.25 percent coverage in 10.5-knot conditions and more than 97.85 percent in 13-knot and greater conditions. The combination of Runway 11-29 and Runway 16-34 provides just 91.83 percent coverage in 10.5-knot conditions, which does not meet the 95 percent coverage requirement for 10.5 knots. Thus, this pairing would not be eligible to be selected for federal/state funding since a third runway would still be needed, and two other two-runway pairing options can meet the standard.

The alternatives to follow will include dual runway scenarios that maintain Runways 11-29 and 2-20 and Runways 16-34 and 2-20, as well as the current three-runway system with the understanding that Ector County could continue funding maintenance for the additional runway. A dual runway system maintaining Runway 11-29 and Runway 16-34 is not being considered as this runway pair does not provide the minimum 95 percent wind coverage required by the FAA.

PRIMARY RUNWAY

No singular runway offers significantly better wind coverage than the others at ODO. Historically, two runways have served in the role as the "primary" runway, with Runway 11-29 currently in the role. Selection of the primary runway is important as it will generally have greater funding support and better instrument approach capabilities. As noted, Runway 11-29 is considered the primary runway. It offers the longest and widest operational surface, the lowest approach minimums, and has the most sophisticated visual and navigational aids (i.e., PAPI-4s and MALS on each runway end). However, as shown on **Exhibits 4 and 26**, Runway 11-29 also has the least favorable alignment of the three available, providing only 77.51 percent wind coverage for 10.5-knot crosswind components and 87.44 percent for 13-knot components. Conversely, Runway 16-34 offers 86.87 percent coverage (10.5-knot conditions) and 92.30 percent coverage (13-knot conditions), while Runway 2-20 provides for 87.00 percent coverage (10.5-knot conditions) and 93.43 percent coverage (13-knot conditions).

Based on wind coverage alone, Runway 11-29 is not best oriented to serve as the primary runway. However, other factors must also be considered, including safety area implications, previous investments in the runway, future investments that would be necessary should Runway 16-34 or Runway 2-20 be designated as primary instead, surrounding land uses, and future development opportunities (i.e., extension potential and improved instrument approach capability).

As discussed previously, the primary runway at ODO should be designed to meet C-III-2400 standards in the ultimate condition. Runway 11-29 currently meets these design standards for width (100 feet wide) and safety areas (RSA and ROFA), with the exception of a very small portion of the ROFA that extends beyond airport property to the east and is obstructed by the perimeter fence. There are also incompatible land uses located within the Runway 11 and Runway 29 RPZs (refer to **Exhibit 25**).

Runways 16-34 and 2-20 are both 75 feet wide, not meeting the 100-foot width requirement for an ultimate C-III-2400 runway. In terms of safety area requirements, neither Runway 16-34 nor Runway 2-20 can meet the ultimate C-III RSA/ROFA requirements without significant impacts to surrounding land uses including residential/business, Yukon Road, and Andrews Highway. None of these land uses are allowable within the RSA or ROFA and would need to be removed or declared distances implemented in order to maintain full safety areas. Declared distances function to identify the runway length which is available while meeting the full safety areas for certain operations and will be discussed in more detail later.

Runway 11-29 has also had significant historical investments in the form of pavement, lighting, and navaids. Decommissioning this runway or reclassifying it as the crosswind could negate many of these benefits and could potentially conflict with grant assurances that the airport sponsor agreed to when federal/state funds were accepted for improvements to the runway.

Finally, the development potential of each runway must also be considered. Runways 11 and 20 offer the best opportunities for extension when factoring surrounding constraining factors. Similarly, the potential for improved instrument approach capability is best on Runways 29 and 20 when considering surrounding land uses.

AIRFIELD DESIGN STANDARDS

ODO is a classified as a Regional GA airport in the NPIAS, which means it has a high level of activity, including activity by turboprops and business jets. Thus, the airfield should be designed to accommodate the most demanding regular users of these types of aircraft. As mentioned, the primary runway should meet C-III-2400 design standards, which is reflective of the type of aircraft expected to use the airport most frequently as well as the instrument approach capability. Alternatives to follow will consider safety area impacts as they relate to these standards with the addition of a non-precision GPS approach with ½-mile visibility minimums. For the secondary and/or additional runway, B-II-5000 standards will be depicted on each of the alternatives.

RUNWAY LENGTH

The runway length analysis conducted in the facility requirements section concluded that 100 percent of small aircraft in the national fleet can comfortably operate at maximum takeoff weight (MTOW) during the hottest periods of the summer. However, ODO also regularly serves turboprop and jet traffic, which could require longer runway lengths. To accommodate 75 percent of the business jet fleet at 60 percent useful load, a runway length of 5,800 is recommended, while a length of 7,600 feet is recommended to accommodate 100 percent of the fleet at 60 percent useful load. The projected ultimate critical aircraft, the Gulfstream V, has been calculated to need 6,280 feet of pavement to take off at 70 percent useful load and 6,960 feet to take off at 80 percent useful load during the hottest times of the year at ODO.

A runway extension must also consider impacts to the runway's associated safety areas and RPZs. FAA design standards state that the RSA must be cleared and graded, and the ROFA must be cleared of obstructions. The RPZ off each runway end should also be free of incompatible land uses. The alternatives will present various extension options as well as mitigative actions to eliminate any obstructions or incompatibilities introduced by any proposed runway extension project.

INSTRUMENT APPROACH CAPABILITY

Another issue to be examined is the ultimate instrument approach capability serving the runway system. This is an important consideration that directly impacts the utility of the airport, with lower visibility minimums increasing the functionality of an airport during instrument meteorological conditions (IMC). Although achieving the lowest instrument approach visibility minimums is advantageous for airport operations, there are multiple safety area requirements tied to the level of instrument approach available. As a result, impacts to the airport environment imposed by the ultimate instrument approach visibility minimums need to be weighed carefully.

Currently, ODO offers published instrument approaches to Runway ends 11, 29, and 20. The lowest visibility minimums are provided on each end of Runway 11-29 via the GPS LPV approaches that offer not lower than ¾-mile minimums. Runway 20 provides a GPS LNAV approach with visibility minimums not lower than 1-mile. The airport sponsor and pilots who use ODO have indicated a strong desire for improved instrument approach capability, including the addition of instrument approach procedures to runways not currently offering an approach. As such, each of the alternatives will illustrate new and/or improved instrument approach capabilities, along with associated increases to safety areas (including RPZs) and any mitigative actions necessary to keep these areas in conformance with FAA design standards.

LAND USE

Airport property currently encompasses approximately 790 acres with existing landside facilities concentrated on the west and northwest sides of the field. A significant portion of airport property is undeveloped, with most of this area located on the north, east, and south sides. If the airport sponsor elects to decommission one of the runways, additional property will become available for development opportunities.

Each of the alternatives to follow will depict land use reserve areas that are focused on separating activity levels and maximizing revenue potential from both aeronautical and non-aeronautical land uses. Aeronautical-related uses are typically reserved for property with direct access to the airfield. For property that is segregated from the airfield, an airport should consider non-aeronautical related development. The FAA typically requires airports to receive approval through a land-use release to lease airport-owned land for non-aviation related purposes. The FAA stipulates that all land with reasonable airside access should be used or reserved for aviation purposes. Currently, there are two non-aeronautical enterprises operating on airport property which should be considered for release, and each of the alternatives will reflect this.

In the next section, Recommended Development Concept, specific layouts for hangar development, aircraft parking apron areas, marked aircraft parking, and other landside facilities will be depicted.

AIRPORT ALTERNATIVE 1

Depicted on **Exhibit 31**, Airport Alternative 1 considers a dual runway system that maintains Runway 11-29 as the primary runway, with Runway 2-20 serving as the crosswind runway. Runway 16-34 is proposed to be closed under this alternative. The alternative also includes a 600-foot northwesterly extension to Runway 11-29, reconfiguration of taxiway geometry, and proposed modifications to bring safety areas into compliance with FAA design standards based on the ultimate runway design code (RDC) for each runway. Primary actions associated with this alternative include:

- **Decommission Runway 16-34** — In all weather conditions, the combined wind coverage for Runway 11-29 and Runway 2-20 is 96.37 percent for 10.5-knot crosswind components and greater than 99.02 percent for 13-knot and greater crosswind components[23], thus meeting the FAA's minimum of 95 percent coverage. With the runway pair of 11-29 and 2-20 providing greater than 95 percent wind coverage, Runway 16-34 would be considered an additional runway by the FAA and thus would not be eligible for federal funding assistance. As mentioned previously, the airport sponsor (Ector County) currently provides funding for the maintenance of Runway 2-20. Under this alternative, Runway 2-20 would become eligible for grant funding assistance as the crosswind runway, while Runway 11-29 would continue to be eligible for funding as the primary runway.

- **Extend Runway 11-29 by 600 feet to the northwest** — To better accommodate the larger jet traffic anticipated to occur at ODO in the future, Airport Alternative 1 proposes a 600-foot extension to Runway 11, bringing the total runway pavement length to 6,800 feet. This is the maximum extension that can be accomplished on this runway while keeping the majority of the RSA and ROFA on existing airport property and without impacting the surrounding road network or implementing declared distances to maintain standard RSA/ROFA (to be discussed). A 0.3-acre portion of the ROFA is proposed to be acquired in fee, as shown on the exhibit.

  As stated previously, justification in the form of 500 annual itinerant operations must be present before grant funding assistance will be provided for a runway extension project. While that need may not exist today, planning for the potential is still important so local land use planning measures can be implemented to allow for the extension should demand materialize.

  Additional projects related to the proposed extension of Runway 11-29 include an extension of Taxiway G to the Runway 11 threshold, as well as relocation of the MALS and PAPI-4 currently serving Runway 11.

- **Increase pavement strength on Runways 11-29 and Runway 2-20** — The Facility Requirements identified a potential need to increase the pavement strength on the airport's primary and crosswind and/or additional runways in anticipation of larger, heavier aircraft operating more frequently at the airport in the future. This alternative considers a pavement strength increase to 100,000 pounds DWL on Runway 11-29 and 30,000 pounds DWL on Runway 2-20.

[23] Refer to Exhibit 26.

- **Mitigate non-standard conditions in the ultimate ROFAs** — As detailed in the Facility Requirements section, when Runway 11-29 transitions to ultimate RDC C-III-2400, the RSA and ROFA dimensions will increase. A small portion of the ultimate ROFA at the Runway 29 end (approximately 0.05 acres) extends beyond airport property and is proposed to be acquired in fee. The expanded ROFA will also encompass the airport's perimeter fencing, which is a non-standard condition. As such, this alternative plans for the fencing to be relocated in this area. Additionally, the wind cones adjacent to Runway 2-20 are located within that runway's ROFA. This alternative proposes relocating the wind cones outside of the Runway 2-20 ROFA.

- **Improve instrument approach capability** — Currently, Runway 11-29 offers the airport's lowest visibility minimums, with ¾-mile GPS LPV approaches to both ends of the runway. Runway 20 also provides an LNAV approach with 1-mile visibility minimums. Airport Alternative 1 proposes lower visibility minimums to Runway 29 through the implementation of a non-precision LPV approach with minimums not lower than ½-mile. To achieve this, the existing medium intensity approach light system (MALS) equipment on Runway 29 would need to be upgraded to a MALSR, which is a MALS with runway alignment indicator lights. The alternative also includes implementation of a GPS approach with 1-mile visibility minimums to Runway 2. The existing instrument approach procedures to Runways 11 and 20 are planned to remain at ¾-mile and 1-mile, respectively.

- **Upgrade visual approach aids** — Runway 11-29 is currently equipped with a PAPI-4 on both ends, while Runway 2-20 has a VASI system at each end of the runway. This alternative plans for the PAPI-4s on Runway 11-29 to remain and for the VASIs on Runway 2-20 to be upgraded to a PAPI-2 system. Neither Runway 11-29 or 2-20 are equipped with REILS; however, as Runway 11 is equipped with a MALS and Runway 29 is planned to be equipped with a MALSR, REILs are not necessary for this runway. Runway 2-20 does not have an approach light system, so this alternative plans for the installation of REILS on both ends of this runway.

- **Reconfigure taxiways** — As detailed in the Facility Requirements, there are several instances of non-standard geometry on the existing taxiway system, including direct access, acute-angle intersections, and high energy crossings. The proposed closure of Runway 16-34 and its associated taxiways, as depicted on **Exhibit 31**, will alleviate some of these issues. The remaining non-standard conditions are proposed to be mitigated through the construction of new taxiway pavement and the inclusion of a no-taxi island at the entrance to Taxiway E.

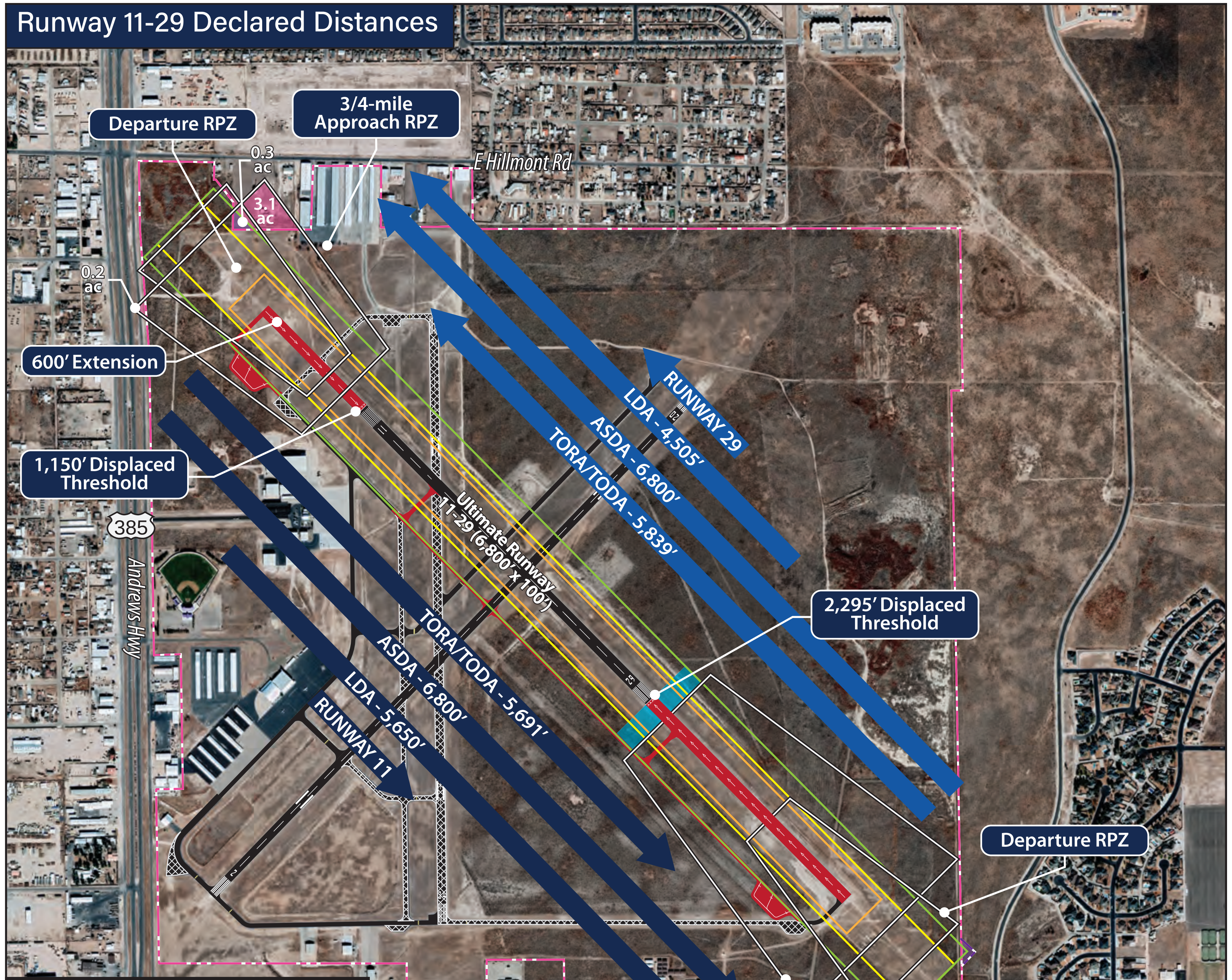
  Airport Alternative 1 proposes construction of a full-length parallel Taxiway G serving Runway 11-29, with new right-angle connectors to serve as runway exits. The existing portions of Taxiway G that connect to each end of Runway 16-34 are planned to be closed. The portion of Taxiway F that extends beyond the Runway 34 threshold and connects to Runway 29 is also planned to be closed.

  The airport currently has holding bays at each end of Runways 11-29 and 2-20. These are a traditional design featuring wide, unmarked pavement. The FAA's preferred design for hold bays includes clearly marked entrance/exits with independent parking areas that are either separated by islands or are clearly marked with centerlines to allow aircraft to safely bypass each other. Airport Alternative 1 includes the construction of standard hold bays at each end of Runway 11-29 and the removal of non-standard hold bay pavement on the airport.


Runway 11-29 RDC: C-III-2400
Runway 2-20 RDC: B-II-5000
Commercial/Industrial
Residential
E Hillmont Rd
3/4-Mile RPZ
Relocate MALS
24.3 ac
0.3 ac
600' Extension
Relocated Wind Cone
1-Mile RPZ
Maintain PAPI-4
500
Install REILs
RPZ Incompatibilities
PAPI-2
Increase Pavement Strength (30,000 lbs DWL)
385
Andrews Hwy
Runway 2-20 (5,703' x 75')
Ultimate Runway 11-29 (6,800' x 100')
Add Precision Markings
Increase Pavement Strength (100,000 lbs DWL)
Relocated Wind Cone
PAPI-2
Acquire 0.05 Acres & Relocate Perimeter Fence
Residential
Install REILs
Maintain PAPI-4
8.3 ac
1-Mile RPZ
Commercial/Industrial
E Yukon Rd
54.4 ac
MALSR
Commercial/Industrial
Residential
RPZ Incompatibilities
1/2-Mile RPZ


AIRPORT LAND USE LEGEND
Small Aircraft Facilities Reserve
T-Hangar Development Reserve
Executive Hangar Development Reserve
Non-Aeronautical Development Reserve/Release
Aeronautical Development Reserve
Large Scale SASO/MRO Development Reserve
E Hillmont Rd
Standard Hold Bay
62.8 ac
500
22.9 ac
Andrews Hwy
385
11.4 ac
18.5 ac
75.5 ac
94.3 ac
Runway 2-20 (5,703' x 75')
Ultimate Runway 11-29 (6,800' x 100')
400
No-Taxi Island
3.0 ac
3.4 ac
74.6 ac
22.8 ac
Standard Hold Bay
3.1 ac
1.4 ac
6.7 ac
21.7 ac
E Yukon Rd
LEGEND
Airport Property Line
Taxiway Designator
Runway Safety Area (RSA)
Runway Object Free Area (ROFA)
Runway Obstacle Free Zone (ROFZ)
Runway Visibility Zone (RVZ)
35' Building Restriction Line (BRL)
ASOS Critical Area
Runway Protection Zone (RPZ)
Uncontrolled Safety Areas
High Energy Area
Precision Obstacle Free Zone (POFZ)
Pavement to be Removed
Avigation Easement
Note: Acreages are approximations and are intended for planning purposes only.
N
0
1,200
SCALE IN FEET
Photo: Google Earth 1/2022

Runway 11-29 Declared Distances



DECLARED DISTANCES

	Runway 11	Runway 29
TORA	5,691'	5,839'
TODA	5,691'	5,839'
ASDA	6,800'	6,800'
LDA	5,650'	4,505'

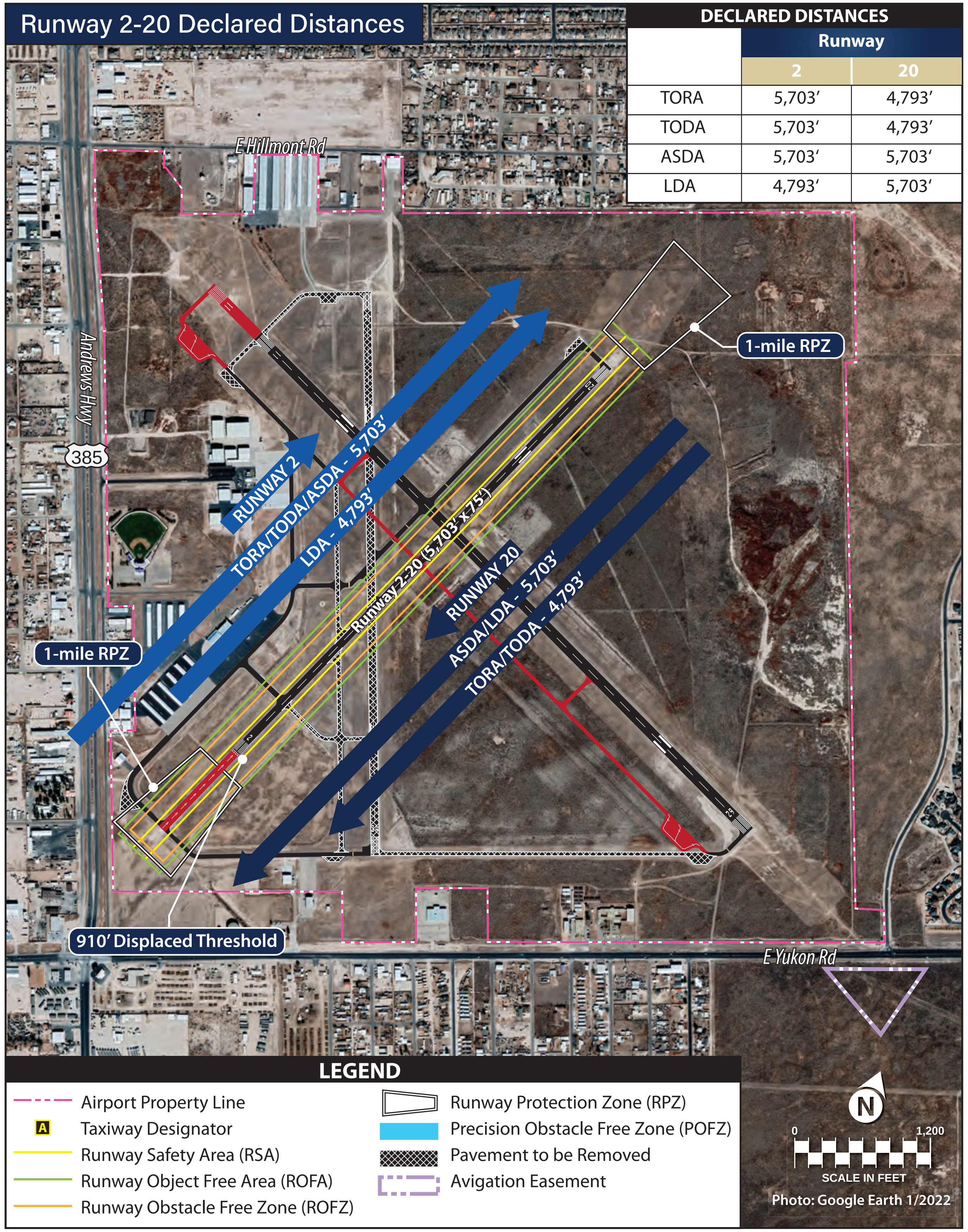
KEY

TORA - Take Off Run Available
ASDA - Accelerate Stop Distance Available
TODA - Take Off Distance Available
LDA - Landing Distance Available

Runway 2-20 Declared Distances

DECLARED DISTANCES

	Runway 2	Runway 20
TORA	5,703'	4,793'
TODA	5,703'	4,793'
ASDA	5,703'	5,703'
LDA	4,793'	5,703'



- **Installation/upgrade of airfield lighting and marking** — Both Runways 11-29 and 2-20 are equipped with MIRL. This alternative plans for this level of runway lighting to be maintained, with additional MIRL on the extended portion of Runway 11-29. There is currently no taxiway lighting at ODO; as such, Airport Alternative 1 plans for the addition of MITL on all taxiways. In accordance with the proposed ½-mile LPV approach to Runway 29, precision markings are proposed on Runway 29. While the approach is considered a non-precision approach (i.e., not an ILS approach), precision markings are required for any runway with visibility minimums below ¾-mile. The additional markings for Runway 29 include touchdown zone and edge markings. The existing non-precision markings on Runway 2-20 are planned to remain.

- **Reserve portions of airport land use for future aeronautical/non-aeronautical development** — The right side of **Exhibit 31** illustrates proposed land uses within the existing airport property. A variety of aviation uses are planned along the flight lines of Runway 11-29 and Runway 2-20, with specific development types concentrated on the west and south sides of the airport where current infrastructure is located. These include parcels earmarked for large scale SASO/MRO development, executive hangar development, T-hangar development, and small aircraft facilities (shade hangars, uncovered parking aprons). This alternative also plans for future reserve areas, primarily on the undeveloped north and east portions of airport property. Areas along the flight lines are reserved for future aeronautical development, while a portion of property adjacent to Dawn Avenue is proposed for non-aeronautical development. As mentioned, specific hangar and apron layouts will be depicted in the next section, Recommended Development Concept.

As previously discussed, the RPZs associated with Runways 11, 29, and 2 extend beyond airport property and encompass incompatible land uses in both the existing and ultimate conditions. Unless there is a significant change to the runway environment, the FAA may allow certain land uses to remain, but as a general rule, any uses that attract people to remain for periods of time should be mitigated. As Runway 11-29 is planned for a significant change (i.e., extension, change in RDC, lower approach minimums), the airport sponsor is expected to take actions to mitigate incompatible uses within the RPZs.

The reverse side of **Exhibit 31** depicts a secondary option (Airport Alternative 1B) to mitigate RPZ incompatibilities for both runways. This option considers the displacement of the runway thresholds for Runways 11, 29, and 2 to remove incompatible land uses within these runways' RPZs. This would be achieved by the application of declared distances. The Runway 11 RPZ can be shifted off potentially incompatible land uses (Andrews Highway, Hillmont Rd., and commercial/industrial land uses) by displacing the Runway 11 threshold by 1,150 feet. Similarly, the Runway 29 and Runway 2 thresholds could be displaced by 2,295 feet and 910 feet, respectively, to bring those RPZs onto airport property and mitigate any potential incompatibilities. While the impact to the airfield in terms of earthwork and construction would be minimal as compared to other alternatives to be presented, the usable length of the runway would be lessened for some operations due to the implementation of declared distances.

Declared distances are used to define the effective runway length for landing and takeoff when a standard safety area cannot be achieved. The declared distances are defined by the FAA as:

- **Takeoff run available (TORA)** — The runway length declared available and suitable for the ground run of an aircraft taking off (factors in the positioning of the departure RPZ)

- **Takeoff distance available (TODA)** — The TORA plus the length of any remaining runway or clearway beyond the far end of the TORA; the full length of the TODA may need to be reduced because of obstacles in the departure area
- **Accelerate-stop distance available (ASDA)** — The runway plus stopway length declared available and suitable for the acceleration and deceleration of an aircraft aborting a takeoff (factors in the length of RSA/ROFA beyond the runway end)
- **Landing distance available (LDA)** — The runway length declared available and suitable for landing an aircraft (factors in the length of RSA/ROFA beyond the runway end and the positioning of the approach RPZ)

Table 35 and the reverse side of **Exhibit 31** details the runway length available during takeoff and landing operations with these declared distances in place. Note that TODA may be reduced further following FAA airspace analysis.

TABLE 35 | Declared Distances for Alternative 1B

	Runway 11	Runway 29	Runway 2	Runway 20
Takeoff Run Available (TORA)[1]	5,691'	5,839'	5,703'	4,793'
Takeoff Distance Available (TODA)[2]	5,691'	5,839'	5,703'	4,793'
Accelerate Stop Distance Available (ASDA)[3]	6,800'	6,800'	5,703'	5,703'
Landing Distance Available (LDA)[3]	5,650'	4,505'	4,793'	5,703'

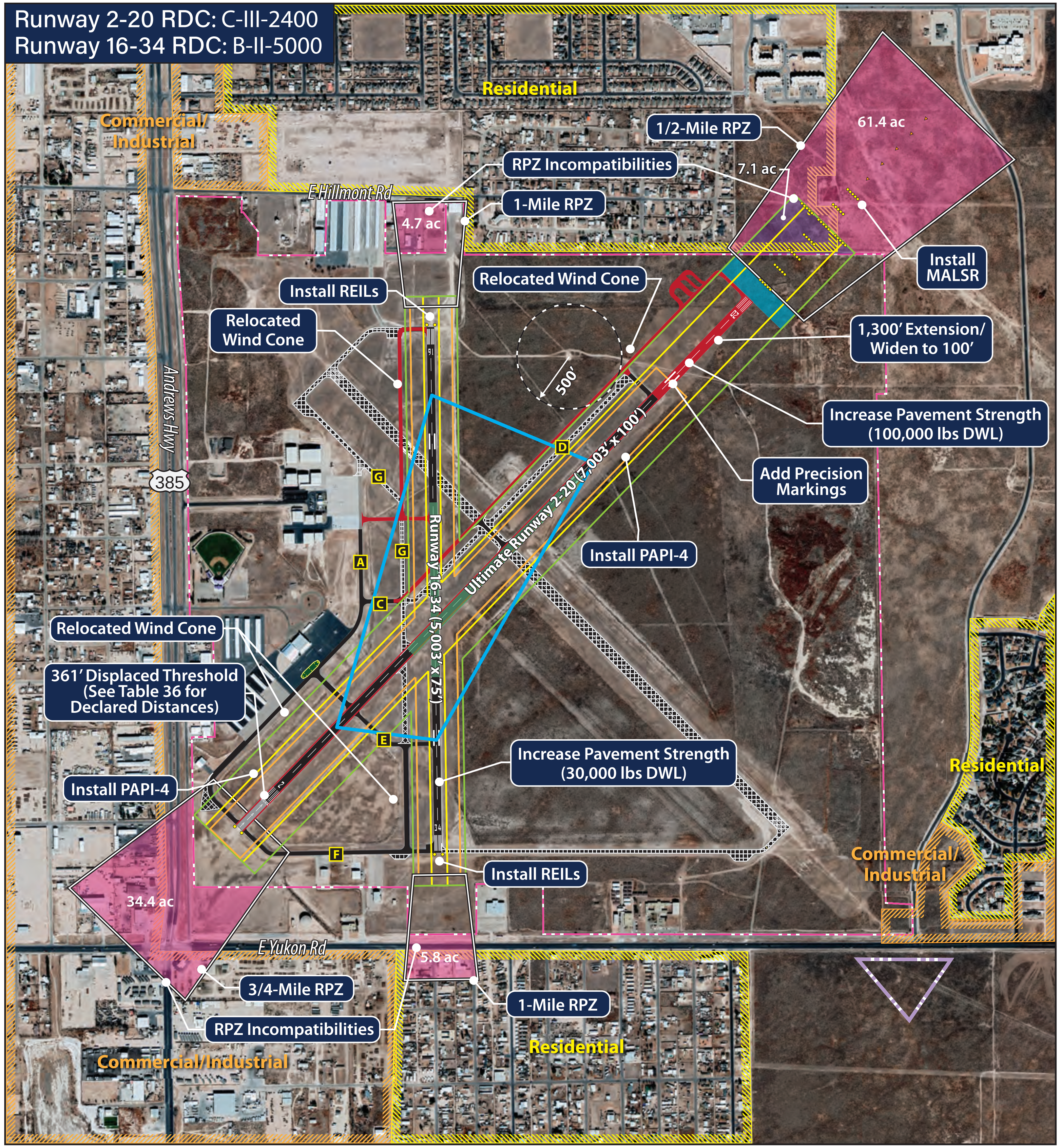
[1] Departure RPZ begins 200 feet from the end of the TORA.
[2] TORA cannot be longer than TODA. Departure surface is set on TODA. TODA can be shortened to mitigate departure surface penetrations; if so, TORA is shortened, too.
[3] Available runway length plus RSA. Approach RPZ begins 200 feet from the landing threshold.
Source: FAA AC 150/5300-13B, Airport Design; Coffman Associates analysis

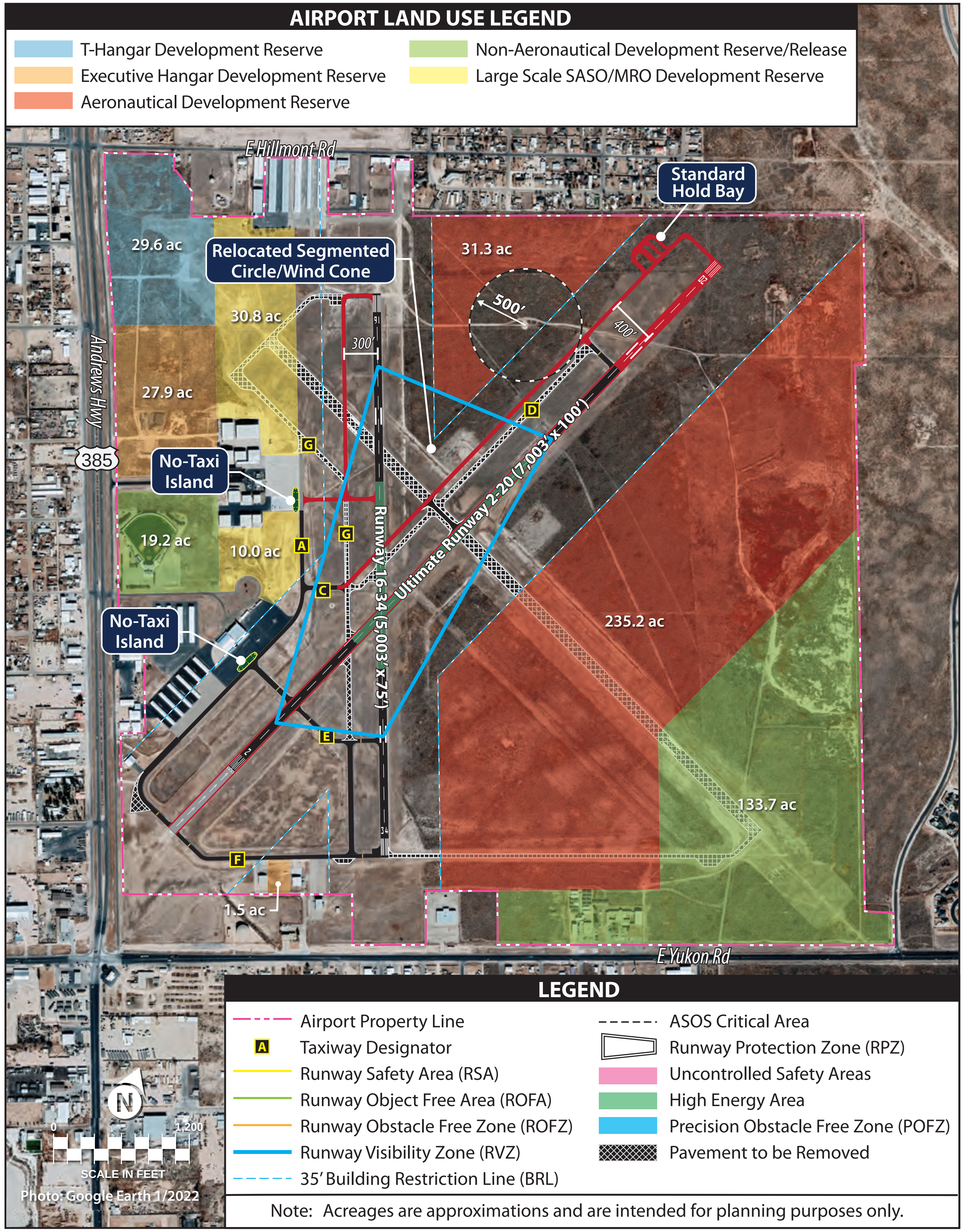
With declared distances in effect, RPZs for both Runways 11-29 and Runway 2-20 would be fully contained on airport property and would not encompass any incompatible land uses. However, there would be negative impacts to takeoff and landing operations for both runways. For aircraft taking off on Runway 11, pilots would have 5,691 feet of available runway, and 5,650 feet for pilots landing on Runway 11. Takeoff length would be reduced for pilots departing via Runway 29, with 5,839 feet of available runway length. For aircraft operating on Runway 2-20, pilots taking off from Runway 2 would have the full runway length available but landing operations would be reduced to 4,793 feet. Pilots departing from Runway 20 would have 4,793 feet of available runway, while the full runway length of 5,703 feet would be available for landing operations on Runway 20. Alternative 1B fully meets FAA design standards pertaining to RPZ incompatibilities, but the drawback to this is a reduction in usable runway length, making it more restrictive to intended users, such as business jets.

Another option to bring RPZs into compliance without having to implement declared distances is to purchase property within the RPZ and remove incompatible land uses (i.e., public roads and structures). If it is not practicable to take these steps, the airport sponsor is expected to complete and submit an Alternatives Evaluation to the FAA ADO to demonstrate that mitigative measures have been analyzed.

AIRPORT ALTERNATIVE 2

Airport Alternative 2, depicted on **Exhibit 32**, illustrates a second option for a dual runway system. Under this alternative, Runways 2-20 and 16-34 are proposed to be maintained and Runway 11-29 is proposed to be decommissioned. Primary actions associated with this alternative include:


Runway 2-20 RDC: C-III-2400
Runway 16-34 RDC: B-II-5000
Residential
Commercial/ Industrial
E Hillmont Rd
1/2-Mile RPZ
61.4 ac
RPZ Incompatibilities
7.1 ac
1-Mile RPZ
4.7 ac
Install MALSR
Install REILs
Relocated Wind Cone
Relocated Wind Cone
1,300' Extension/ Widen to 100'
500'
Increase Pavement Strength (100,000 lbs DWL)
Andrews Hwy
385
Add Precision Markings
Ultimate Runway 2-20 (7,003' x 100')
Runway 16-34 (5,003' x 75')
Install PAPI-4
Relocated Wind Cone
361' Displaced Threshold (See Table 36 for Declared Distances)
Increase Pavement Strength (30,000 lbs DWL)
Install PAPI-4
Residential
Commercial/ Industrial
Install REILs
34.4 ac
E Yukon Rd
5.8 ac
3/4-Mile RPZ
1-Mile RPZ
RPZ Incompatibilities
Residential
Commercial/Industrial

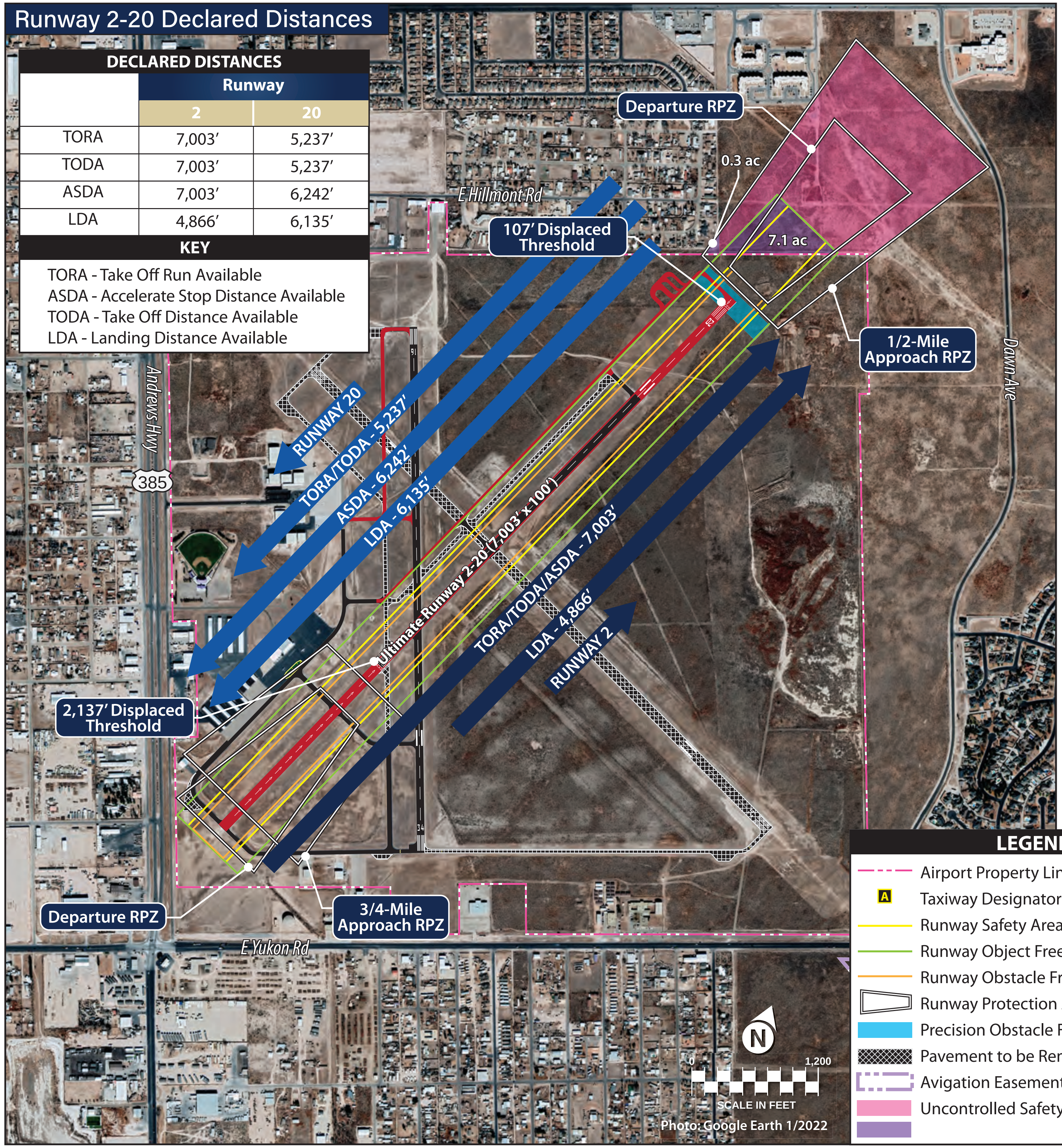

AIRPORT LAND USE LEGEND
T-Hangar Development Reserve
Executive Hangar Development Reserve
Aeronautical Development Reserve
Non-Aeronautical Development Reserve/Release
Large Scale SASO/MRO Development Reserve
E Hillmont Rd
Standard Hold Bay
29.6 ac
Relocated Segmented Circle/Wind Cone
31.3 ac
500'
400'
30.8 ac
300'
27.9 ac
Andrews Hwy
385
No-Taxi Island
19.2 ac
10.0 ac
Ultimate Runway 2-20 (7,003' x 100')
Runway 16-34 (5,003' x 75')
No-Taxi Island
235.2 ac
133.7 ac
1.5 ac
E Yukon Rd
N
SCALE IN FEET
0
1,200
Photo: Google Earth 1/2022
LEGEND
Airport Property Line
Taxiway Designator
Runway Safety Area (RSA)
Runway Object Free Area (ROFA)
Runway Obstacle Free Zone (ROFZ)
Runway Visibility Zone (RVZ)
35' Building Restriction Line (BRL)
ASOS Critical Area
Runway Protection Zone (RPZ)
Uncontrolled Safety Areas
High Energy Area
Precision Obstacle Free Zone (POFZ)
Pavement to be Removed
Note: Acreages are approximations and are intended for planning purposes only.

Runway 2-20 Declared Distances

DECLARED DISTANCES	Runway	
	2	20
TORA	7,003′	5,237′
TODA	7,003′	5,237′
ASDA	7,003′	6,242′
LDA	4,866′	6,135′

KEY

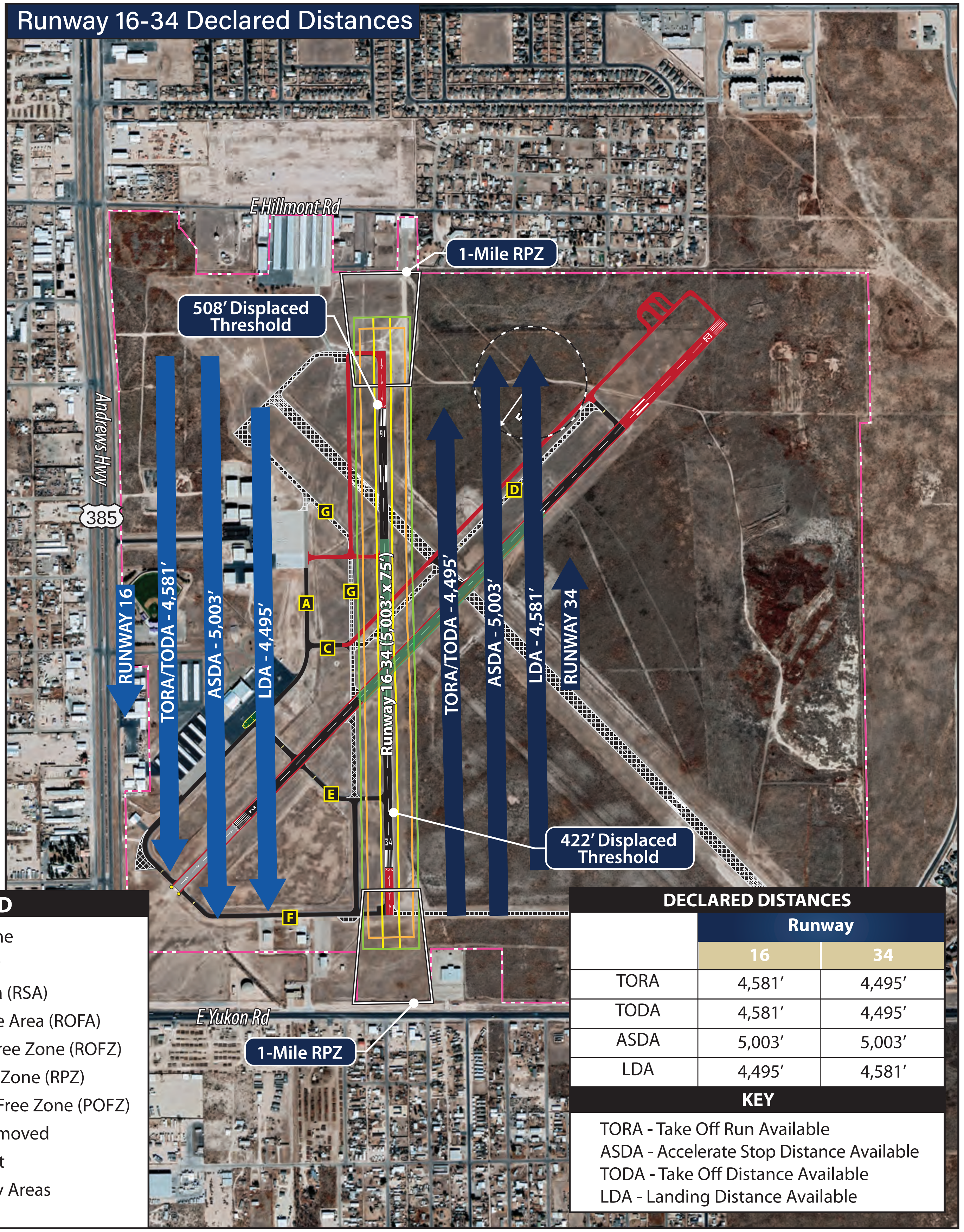
TORA - Take Off Run Available
ASDA - Accelerate Stop Distance Available
TODA - Take Off Distance Available
LDA - Landing Distance Available



LEGEND

- Airport Property Line
- Taxiway Designator
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Runway Obstacle Free Zone (ROFZ)
- Runway Protection Zone (RPZ)
- Precision Obstacle Free Zone (POFZ)
- Pavement to be Removed
- Avigation Easement
- Uncontrolled Safety Areas

Runway 16-34 Declared Distances



DECLARED DISTANCES	Runway	
	16	34
TORA	4,581′	4,495′
TODA	4,581′	4,495′
ASDA	5,003′	5,003′
LDA	4,495′	4,581′

KEY

TORA - Take Off Run Available
ASDA - Accelerate Stop Distance Available
TODA - Take Off Distance Available
LDA - Landing Distance Available

- **Decommission Runway 11-29** — In all weather conditions, the combined wind coverage for Runway 2-20 and Runway 16-34 is 95.25 percent for 10.5-knot crosswind components and greater than 97.85 percent for 13-knot and greater components[24], thus meeting the FAA's minimum of 95 percent coverage. As with Airport Alternative 1, a third runway would be considered an 'additional' runway by the FAA and would not be eligible for federal funding assistance. Under this alternative, both Runway 2-20 and Runway 16-34 would be eligible for federal funding assistance.

  As Runway 11-29 is currently the longest and widest runway with the best instrument approach capability, as well as approach lighting systems on both ends, significant modifications would be necessary to bring another of ODO's runways up to the same level of service currently provided by Runway 11-29. Runway 2-20 offers the best potential for this as it is less constrained than Runway 16-34. Therefore, Airport Alternative 2 will consider Runway 2-20 as the primary runway meeting RDC C-III-2400 standards, with Runway 16-34 serving as the crosswind and meeting B-II-5000 design standards.

- **Extend Runway 2-20 1,300 feet to the north and increase width** — Airport Alternative 2 proposes a 1,300-foot extension to Runway 20, bringing the total runway length to 7,003 feet. In order to meet ultimate RDC C-III-2400 design standards for runway width, the alternative also includes a plan to widen the runway to 100 feet. At these dimensions, Runway 2-20 will be capable of safely accommodating all piston aircraft and many of the turboprop and business jet aircraft that currently, and are anticipated to, use the airport.

- **Increase pavement strength on Runways 2-20 and Runway 16-34** — Like the previous alternative, Airport Alternative 2 plans for pavement strength increases for both the primary and crosswind runways. As such, this alternative considers a pavement strength increase to 100,000 pounds DWL on Runway 2-20 and 30,000 pounds DWL on Runway 16-34.

- **Mitigate non-standard conditions in the ultimate RSA/ROFA** — With Runway 2-20 being proposed as the primary runway and meeting ultimate RDC C-III-2400, the RSA and ROFA dimensions will increase. At the Runway 20 end, the RSA and ROFA extend beyond the airport's existing property line, with approximately 7.1 acres uncontrolled. This alternative proposes fee simple acquisition of this property, which is undeveloped, as the FAA requires the airport sponsor to maintain ownership and control over the RSA and ROFA.

  At the Runway 2 end, a similar issue exists, with the RSA and ROFA extending beyond airport boundaries and encompassing adjacent roadways (Andrews Highway and Yukon Road) and businesses. An alternate option to owning this property outright and relocating roads and structures is to displace the threshold and implement declared distances in order to provide the full RSA and ROFA. Airport Alternative 2A on the front side of **Exhibit 32** proposes to displace the Runway 2 threshold by 361 feet and implement the declared distances outlined in **Table 36** to bring these safety areas onto airport property:

[24] Refer to Exhibit 26.

TABLE 36 | Declared Distances for Alternative 2A

	Runway 2	Runway 20
TORA	7,003'	7,003'
TODA	7,003'	7,003'
ASDA	7,003'	6,242'
LDA	6,642'	6,242'

Source: FAA AC 150/5300-13B, Airport Design; Coffman Associates analysis

With a 361-foot displaced threshold on Runway 2, pilots taking off from Runway 2 would have the full 7,003 feet of runway pavement available, while landing operations on Runway 2 would be reduced to 6,642 feet. Pilots taking off from Runway 20 would also have the full runway length available, except during a rejected takeoff, where the ASDA is shortened to 6,242 feet. Landing operations on Runway 2 are also reduced to 6,242 feet of available pavement. **Exhibit 33** illustrates these declared distances in graphic form.

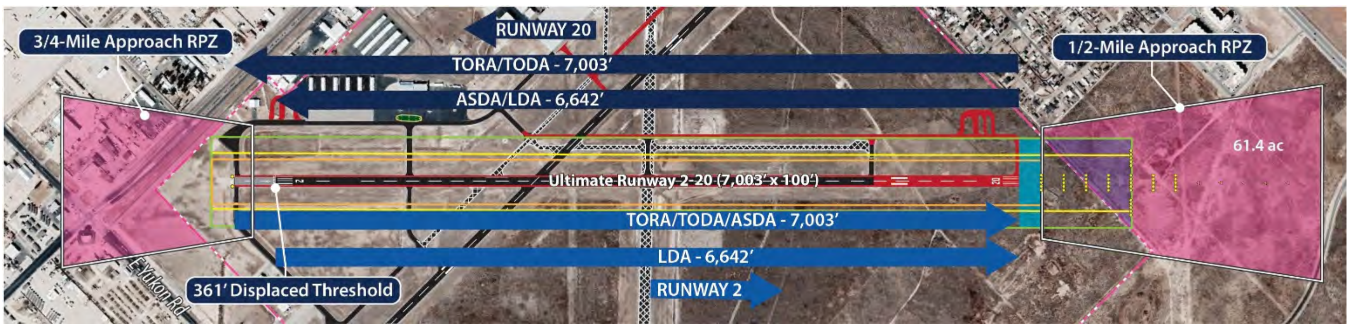


Exhibit 33 – Runway 2-20 Declared Distances (Alternative 2A)

It should be noted that this displacement does not allow for the Runway 2 RPZ to be contained on airport property. If this property cannot be purchased fee simple and incompatible land uses removed, additional displacement may be necessary (to be discussed as Alternative 2B at the end of this section).

Airport Alternative 2 also proposes the relocation of additional obstructions, including the wind cones at the ends of Runways 2-20 and 16-34, as well as the perimeter fencing at the extended Runway 20 end.

- **Improve instrument approach capability** — Currently, this runway pair offers just one instrument approach, with Runway 20 providing an LNAV approach with 1-mile visibility minimums. Runways 2 and 16-34 are visual runways. Airport Alternative 2 proposes lower visibility minimums to Runway 20 through the implementation of an LPV GPS approach which could provide minimums down to ½-mile. As with the previous alternative, installation of a MALSR on Runway 20 is planned in order to achieve this approach, along with precision markings. Runway 2 is planned for a GPS approach with visibility minimums down to ¾-mile. GPS approaches with 1-mile visibility minimums are proposed for both ends of Runway 16-34. No additional ground-based equipment is needed for the proposed instrument approaches to Runway 16-34.

- **Upgrade visual approach aids** — Runway 2-20 is currently equipped with a VASI system on each end, while Runway 16-34 is equipped with PAPI-2. This alternative proposes PAPI-4s to replace the VASIs on Runway 2-20 and the existing PAPI-2 system on Runway 16-34 to remain. Neither runway is equipped with REILS. As such, REILs are proposed for runways not being planned for a more sophisticated approach lighting system (i.e., the MALSR planned for Runway 20), as indicated on **Exhibit 32**.

- **Reconfigure taxiways** — Like the previous alternative, Airport Alternative 2 plans for modification to the taxiway system to correct instances of non-standard taxiway geometry. The proposed closure of Runway 11-29 under this alternative alleviates some of these issues; however, additional changes are proposed to provide for more efficient aircraft movements while meeting FAA design standards.

  With Runway 2-20 functioning as ODO's primary runway, the existing 300-foot runway-taxiway separation between 2-20 and Taxiway D does not meet ultimate RDC C-III-2400 design standards. The standard for this RDC is 400 feet, so this alternative proposes construction of new taxiway pavement to serve much of Runway 2-20, with a standard hold bay planned at the Runway 20 end. The segmented circle and lighted wind cone located near the juncture of Runways 2-20 and 11-29 is proposed to be relocated to the west to accommodate the relocated parallel taxiway. A new partial-parallel taxiway is also planned for Runway 16-34, with a new connector planned to provide access to the terminal apron. Two no-taxi islands are planned at the entrance to this proposed connector and at the entrance to Taxiway E to eliminate the direct access presented by these alignments.

- **Installation/upgrade of airfield lighting and marking** — Both Runways 2-20 and 16-34 are equipped with MIRL. This alternative plans for this level of runway lighting to be maintained, with additional MIRL on the extended portion of Runway 2-20. There is currently no taxiway lighting at ODO, so this alternative plans for the addition of MITL on all taxiways. In accordance with the proposed ½-mile LPV approach to Runway 29, precision markings are proposed on Runway 20. These markings include the addition of touchdown zone and edge markings. The existing non-precision markings on Runway 16-34 are planned to remain.

- **Reserve portions of airport land use for future aeronautical/non-aeronautical development** — Similar to Airport Alternative 1, the right side of **Exhibit 32** illustrates proposed land uses within the existing airport property. On the east side of the airport, approximately 235.2 acres of property along the Runway 2-20 and 16-34 flight line is proposed for aeronautical development reserve, along with more than 130 acres earmarked for non-aeronautical reserve. On the west side of the airport, a variety of aviation uses are planned, again with specific development types concentrated near current infrastructure.

Airport Alternative 2B on the reverse side of **Exhibit 32** shows a secondary option for mitigating potential RPZ incompatibilities associated with Runways 2-20 and 16-34. As Runway 2-20 is proposed to undergo a significant change under this alternative (i.e, extension, width increase, RDC transition to C-III-2400, and lower visibility minimums that increase the size of the RPZs), the airport sponsor is required to demonstrate an effort to control land within the RPZ and mitigate incompatible uses. This option illustrates a greater displacement of Runway 2 (2,137 feet) to bring the RPZ onto airport property, along with a 107-foot displaced threshold on Runway 20 to shift the RPZ off of Dawn Avenue. As shown on the exhibit, a portion of the Runway 20 RPZ remains off airport property and should be controlled through fee simple acquisition or avigation easement. The 0.3-acre portion of the Runway 20 RPZ that encompasses a residential land use is proposed to be acquired in fee. **Table 37** details the declared distances that would be implemented to maintain standard RPZs on Runways 2-20 and 16-34.

TABLE 37 | Declared Distances for Alternative 2B

	Runway 2	Runway 20	Runway 16	Runway 34
TORA	7,003’	5,237’	4,581’	4,495’
TODA	7,003’	5,237’	4,581’	4,495’
ASDA	7,003’	6,242’	5,003’	5,003’
LDA	4,866’	6,135’	4,495’	4,581’

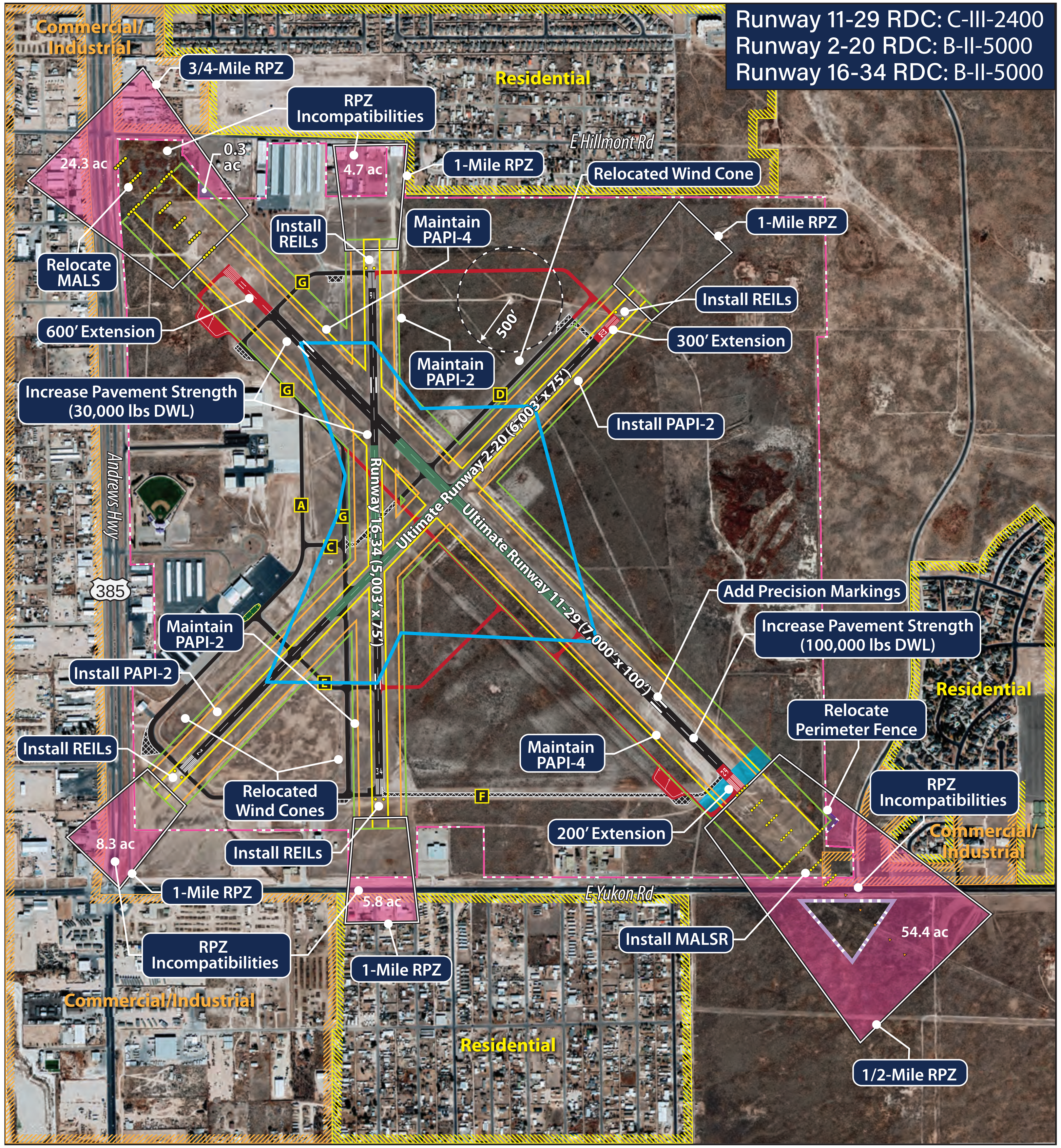
Source: FAA AC 150/5300-13B, Airport Design; Coffman Associates analysis

AIRPORT ALTERNATIVE 3

Airport Alternative 3, presented on **Exhibit 34**, illustrates a scenario in which all three runways are maintained. Under this alternative, Runway 11-29 is planned to meet ultimate RDC C-III-2400 standards and is considered the primary runway. Runway 2-20 would serve as the crosswind runway, meeting B-II-5000 design standards. Both runways would be eligible for federal funding assistance. Runway 16-34 is also proposed to meet B-II-5000 standards but would function as an ‘additional’ runway and would therefore be the responsibility of Ector County to maintain. Primary actions associated with this alternative include:

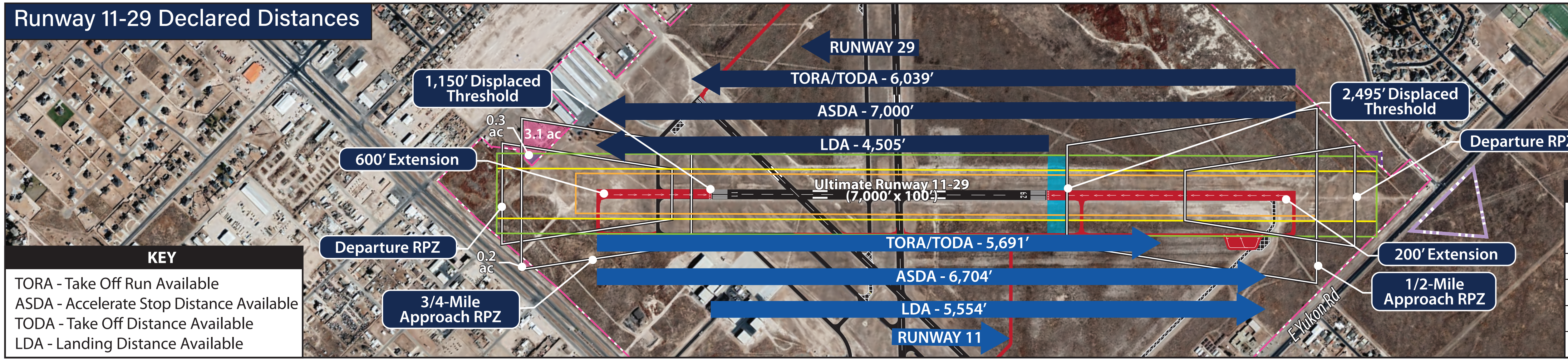
- **Extend Runway 11-29 600 feet to the northwest and 200 feet to the southeast** — Airport Alternative 3 proposes extensions to both ends of Runway 11-29 – a 600-foot extension to Runway 11 and a 200-foot extension to Runway 29, bringing the total runway length to 7,000 feet. Like Airport Alternative 1, the 600-foot extension to Runway 11 maintains the majority of the RSA and ROFA on existing airport property (except for a 0.3-acre portion), eliminating the need to modify the surrounding road network or implement declared distances to maintain control over these safety areas. However, the 200-foot extension to the Runway 29 end would require either a realignment of Yukon Road outside of these safety areas or the implementation of declared distances meet RSA/ROFA design standards (to be discussed). Other actions connected to the Runway 11-29 extension include new taxiway pavement and relocation of the approach lights and PAPI-4s serving both runway ends.

- **Extend Runway 2-20 300 feet to the north** — A 300-foot extension is also proposed to Runway 20, bringing the total runway length to 6,003 feet. As the crosswind runway, Runway 2-20 should be capable of safely accommodating most of aircraft that currently, and are anticipated to, use the airport, including more demanding turboprop and jet aircraft. As has been stated, runway extension projects must be justified before the FAA/TxDOT will participate in funding assistance. While justification to extend this runway may not currently exist, it is important to plan for this potential to ensure that appropriate land use measures are put into place to allow for the extension in the future if specific demand can be identified.


Runway 11-29 RDC: C-III-2400
Runway 2-20 RDC: B-II-5000
Runway 16-34 RDC: B-II-5000
Commercial/Industrial
Residential
3/4-Mile RPZ
RPZ Incompatibilities
24.3 ac
0.3 ac
4.7 ac
1-Mile RPZ
E Hillmont Rd
Relocated Wind Cone
Install REILs
Maintain PAPI-4
1-Mile RPZ
Relocate MALS
Install REILs
600' Extension
300' Extension
500'
Maintain PAPI-2
Increase Pavement Strength (30,000 lbs DWL)
Install PAPI-2
Andrews Hwy
385
Runway 16-34 (5,003' x 75')
Ultimate Runway 2-20 (6,003' x 75')
Ultimate Runway 11-29 (7,000' x 100')
Add Precision Markings
Increase Pavement Strength (100,000 lbs DWL)
Maintain PAPI-2
Install PAPI-2
Residential
Relocate Perimeter Fence
Install REILs
Maintain PAPI-4
RPZ Incompatibilities
Relocated Wind Cones
8.3 ac
Install REILs
200' Extension
Commercial/Industrial
1-Mile RPZ
5.8 ac
E Yukon Rd
Install MALSR
54.4 ac
RPZ Incompatibilities
1-Mile RPZ
Commercial/Industrial
Residential
1/2-Mile RPZ


AIRPORT LAND USE LEGEND
Small Aircraft Facilities Reserve
Executive Hangar Development Reserve
Aeronautical Development Reserve
Non-Aeronautical Development Reserve/Release
Large Scale SASO/MRO Development Reserve
E Hillmont Rd
Andrews Hwy
22.0 ac
500'
300'
Standard Hold Bay
22.6 ac
385
19.2 ac
11.0 ac
44.4 ac
125.0 ac
No-Taxi Island
2.8 ac
Runway 16-34 (5,003' x 75')
Ultimate Runway 2-20 (6,003' x 75')
Ultimate Runway 11-29 (7,000' x 100')
54.3 ac
Standard Hold Bay
400'
2.9 ac
1.5 ac
6.7 ac
7.5 ac
E Yukon Rd
LEGEND
Airport Property Line
Taxiway Designator
Runway Safety Area (RSA)
Runway Object Free Area (ROFA)
Runway Obstacle Free Zone (ROFZ)
Runway Visibility Zone (RVZ)
35' Building Restriction Line (BRL)
ASOS Critical Area
Runway Protection Zone (RPZ)
Uncontrolled Safety Areas
High Energy Area
Precision Obstacle Free Zone (POFZ)
Pavement to be Removed
Avigation Easement
Note: Acreages are approximations and are intended for planning purposes only.
N
0
1,200
SCALE IN FEET
Photo: Google Earth 1/2022

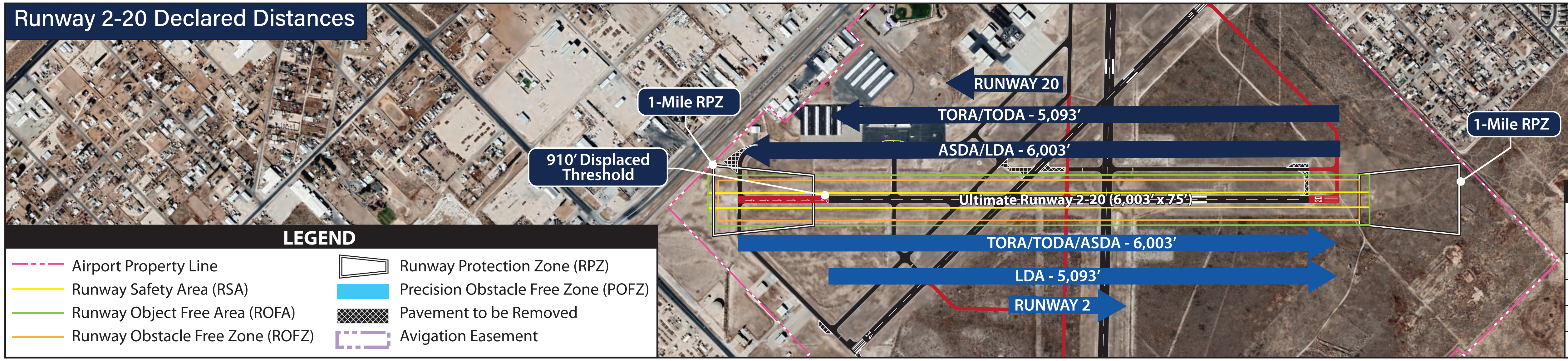
Runway 11-29 Declared Distances



DECLARED DISTANCES

	Runway 11	Runway 29
TORA	5,691′	6,039′
TODA	5,691′	6,039′
ASDA	6,704′	7,000′
LDA	5,554′	4,505

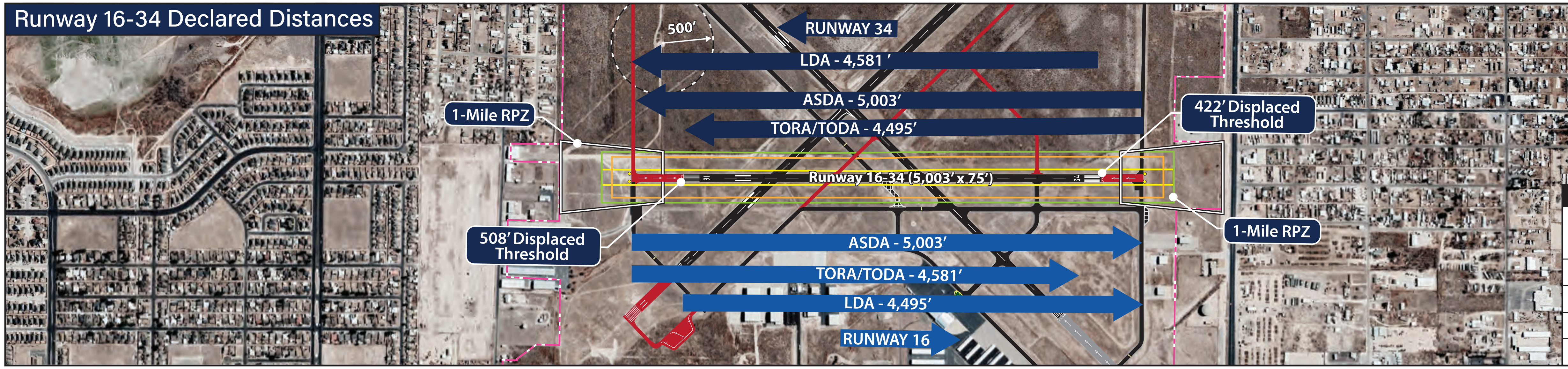
Runway 2-20 Declared Distances



DECLARED DISTANCES

	Runway 2	Runway 20
TORA	6,003′	5,093′
TODA	6,003′	5,093′
ASDA	6,003′	6,003′
LDA	5,093′	6,003′

Runway 16-34 Declared Distances



DECLARED DISTANCES

	Runway 16	Runway 34
TORA	4,581′	4,495′
TODA	4,581′	4,495′
ASDA	5,003′	5,003′
LDA	4,495′	4,581′

- **Increase pavement strength on all runways** — Like the previous alternatives, Airport Alternative 3 considers a pavement strength increase to 100,000 pounds DWL on the primary runway (11-29) and 30,000 pounds DWL on the crosswind runway (2-20). Runway 16-34 is also proposed to be strengthened to 30,000 pounds DWL.

- **Mitigate non-standard conditions in the ultimate RSA/ROFA** — Under this alternative, several obstructions to the RSA and/or the ROFA are present. With the 200-foot extension to Runway 29, 704 feet of RSA/ROFA past the runway end is available, which 296 feet short of meeting the standard 1,000 feet. Airport Alternative 3 proposes implementation of declared distances to provide standard RSA/ROFA without impacting Yukon Road or needing to relocate any perimeter fencing that would otherwise obstruct the ultimate RSA/ROFA. A displaced threshold on Runway 29 is not necessary as the RSA/ROFA standards allow for 600 feet prior to threshold, which is possible even with the 200-foot extension. **Table 38** details the declared distances would be in effect:

TABLE 38 | Declared Distances for Alternative 3A

	Runway 11	Runway 29
TORA	7,000’	7,000’
TODA	7,000’	7,000’
ASDA	6,704’	7,000’
LDA	6,704’	7,000’

Source: FAA AC 150/5300-13B, Airport Design; Coffman Associates analysis

With these declared distances, pilots taking off from Runway 11 would have the full 7,000 feet of runway pavement available except during a rejected takeoff where the ASDA is 6,704 feet, while landing operations would be reduced to 6,704 feet. All operations on Runway 29 would have the full runway length available. **Exhibit 35** illustrates these declared distances in graphic form.

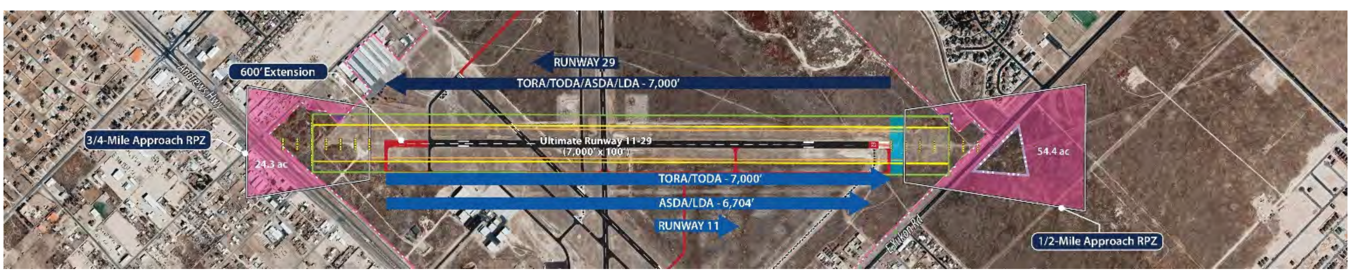


Exhibit 35 – Runway 11-29 Declared Distances (Alternative 3A)

As with previous exhibits, the reverse side of the exhibit shows greater displacement of runway thresholds where the associated RPZ extends beyond airport boundaries and encompasses incompatible land uses, which will be discussed.

Additional obstructions to these ultimate safety areas include the wind cones near the ends of Runways 2-20 and 16-34. These are planned to be relocated outside of these runways’ ROFAs.

- **Improve instrument approach capability** — Airport Alternative 3 plans for improved instrument approach capability to Runways 29, Runway 2, and Runway 16-34. Like the first alternative, Runway 29 is proposed to be equipped with a MALSR to support a ½-mile GPS LPV approach. Runways 2 and 16-34, none of which currently provide an instrument approach, are planned for GPS approaches with visibility minimums down to 1-mile. The existing ¾-mile LPV GPS approach to Runway 11 and the 1-mile LNAV GPS approach to Runway 20 would remain.

- **Upgrade visual approach aids** — As previous alternatives, an upgrade to existing visual approach aids and the installation of new visual approach aids is planned under this option. The alternative proposes to maintain the existing PAPI-4s on Runway 11-29 and the existing PAPI-2s on Runway 16-34. The VASI system on each end of Runway 2-20 is proposed to be replace with PAPI-2s. REILs are proposed at the ends of Runways 2-20 and 16-34, with the existing MALS on Runway 11 and the planned MALSR on Runway 29 negating the need for REILs on these runway ends.

- **Reconfigure taxiways** — A full-length parallel taxiway is proposed for Runway 11-29, with standard holding bays planned at each end. Taxiway F, which currently connects to Runway 29, is proposed to be closed west of Runway 34, with new taxiway pavement extending from existing Taxiway E to connect with the planned parallel to Runway 11-29. A portion of Taxiway D where it crosses Runway 16-34 is also proposed to be closed, as the new Taxiway G pavement in this area would not allow for adequate space to hold between the holding line markings. As the partial closure of Taxiway D eliminates the quickest taxi route to Runway 20, new taxiway pavement extending west from the Runway 16 threshold is planned to provide access to Runway 20. Direct access from the apron is planned to be mitigated by the construction of a no-taxi island at the entrance to Taxiway E.

- **Installation/upgrade of airfield lighting and marking** — As with previous alternatives, the existing MIRL on each runway is planned to be maintained under this alternative, with new MIRL added to extended runway pavement. The existing taxiway reflectors are proposed to be replaced with MITL on all taxiway pavement. To support the proposed ½-mile LPV approach to Runway 29, precision markings are proposed on Runway 29. These markings include the addition of touchdown zone and edge markings. The existing non-precision markings on Runways 2-20 16-34 are planned to remain

- **Reserve portions of airport land use for future aeronautical/non-aeronautical development** — The right side of **Exhibit 34** illustrates proposed land uses within the existing airport property, again depicting specific aeronautical uses near existing landside facilities and reserve property on the undeveloped west and south sides.

The reverse side of **Exhibit 34** shows a secondary option (Airport Alternative 3B) for mitigating RPZ incompatibilities associated with Runways 11, 29, 2, 16, and 34. A displacement of the Runway 20 threshold is also not necessary as the RPZ remains on airport property, even with the 300-foot extension to this runway end. To maintain the three-runway system as proposed in Alternative 3A and achieve standard RPZs without the need to acquire property or reroute roads, the following threshold displacements would be necessary:

- Runway 11 – Displace threshold 1,150 feet to bring ¾-mile approach RPZ onto airport property
- Runway 29 – Displace threshold 2,495 feet to bring ½-mile approach RPZ onto airport property

- Runway 2 – Displace threshold 910 feet to bring 1-mile approach RPZ onto airport property
- Runway 20 – No displacement necessary
- Runway 16 – Displace threshold 508 feet to bring 1-mile approach RPZ onto airport property
- Runway 34 – Displace threshold 422 feet to bring 1-mile approach RPZ onto airport property

Table 38 includes the declared distances that would be in effect for Runways 11-29, 2-20, and 16-34 if the RPZs are brought fully onto airport property.

TABLE 38 | Declared Distances for Alternative 3B

	Runway 11	Runway 29	Runway 2	Runway 20	Runway 16	Runway 34
TORA	5,691’	6,039’	6,003’	5,093’	4,581’	4,495’
TODA	5,691’	6,039’	6,003’	5,093’	4,581’	4,495’
ASDA	6,704’	7,000’	6,003’	6,003’	5,003’	5,003’
LDA	5,554’	4,505’	5,093’	6,003’	4,495’	4,581’

Source: FAA AC 150/5300-13B, Airport Design; Coffman Associates analysis

SUMMARY

The airport development alternatives have focused on several elements that include potential runway extension, mitigating safety area deficiencies, improving existing and future taxiway development on the airfield, and enhancing instrument approach capabilities to the runway system. On the landside, reserve areas have been highlighted for specific types of aeronautical development as well as aeronautical and non-aeronautical reserve areas. These alternatives will be considered by the planning advisory committee, Ector County, TxDOT, and the FAA. Following discussion and review with these entities, a preferred recommended development concept the includes specific landside layouts (hangars, apron areas, etc.) will be drafted and presented in the next section of this report.

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